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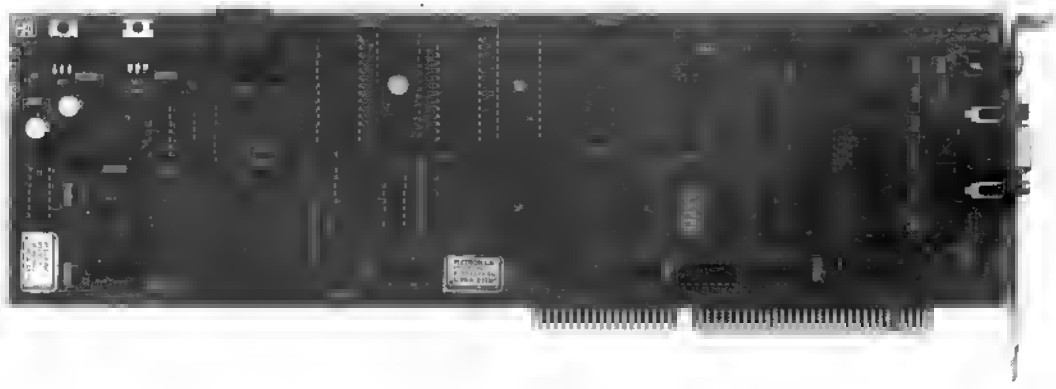

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Amateur Digital Communications

What Comes Next? -- Part One

Edited by Jim Mortensen, N2HOS • PO Box 328 • Indian Rocks Bch, FL 34635
CompuServe ID: 71573,1077

Contributors to this series include Hans N8PGR, Bill K9GWT, Charles NX2T, Chiharu JA3DLE/1, David K1ZZ[1], Don W6JL, Fred DK4ZC, Joe W3/G3ZCZ, Nick N4SS, Peter TY1PS, Phil K0XI and Tapani OH2LU. Part Two will appear in next month's Digital Journal. We wish to extend our thanks to each and every one for the gracious gift of their time and talent. Nothing could happen without them!

Lincoln Steffens, noted writer, lecturer and a keen observer of America's social scene, visited Russia at the height of his career. The year was 1919, not long after Lenin and company rose up, ousted royalty, church and state and then introduced communism to the world. Upon returning to the US, Steffens said to Bernard Baruch, the rich man who could read stock markets and who later became famous as the adviser to many presidents, "*I have been over to the future . . . and it works!*" The art of forecasting thus suffered an almost mortal blow.

Despite such risks, the Digital Journal called on a group of observers and experts from around the world to demonstrate that the science of the forecast is alive and well and living on 20 meters! Please understand—these are not the generic faces of the eternally erroneous economists we see each day on TV. These contributors are the doers, the makers, the movers and the shakers of digital communications. No textbook prognosticators, this bunch speaks directly from their experience in designing the components, making the hardware, writing the software, observing the scene . . . and /or sitting at the keyboard making digital connections on the air in good conditions and bad. Their background is impressive and their comments enlighten us. And, we trust, open our eyes to potential developments in the amazing digital world with an accuracy far great than Mr. Steffens. Only time will tell.

COMPUTERS . . .

the driving force behind the communications revolution!

We begin where we most often sit, at the front end of the computer, for this is the point at which we create the digital signal and to which a friendly answer returns. This is the state-of-our-art and a technological wonderland (at least to the proprietor). Though we might dream about and perhaps prefer more power, faster speeds, better soffware, higher antennas, added peripherals, new modes and an ever greater challenge, there is also a little voice inside saying, "*Wait a minute. I have all my gear upgraded and in place. I have a good computer, useful software, a bit of disk space left, top-flight TNC and transceiver and a new antenna. I've mastered, at last, all the elements of this complex installation. It's time now to settle back; time to enjoy what I have learned over the past years; time to catch up on all those QSO's and that rare DX I missed while I was boning up on technology; time for me and progress to take a break. Don't rock the boat. Besides, what else can they come up with now?*"

This little voice of caution frequently loses the tug-of-war, for few of us can withstand the siren's song which lures us into ever more hazardous waters. We fall for it, not just because we lust for the power and speed, but because it has become so downright inexpensive to have it all. And once we go for the $1295 complete 486/33 package at the discount store, there is no avoiding the exploration of its potential. We add this, then that, both inside and out . . . and soon have a powerhouse sitting on the desk, and a battle hardened and wiser operator sitting before it. The growing power and speed of the computer, according to our rationalization, leads to the development of ever better communications software to make the life of those of us who sit at the console more effective and more fun. But not more comfortable. Each improvement spawns at least two or three additional challenges and few of us resist the urge to explore them, to try the new and exciting because it sits there on top of our desk.

You may come to think that this series is all about the computer and not the RF side of the shack. Like it or not, such is truly the case, for the computer's exptoding power and flexibility . . . and its pricing free-fall . . . made it the driving force behind the digital communication revolution—amateur and commercial. Whether we view the digital world in a micro sense (that is, just the amateur world) or take a macro view, the dirt cheap and miniaturized computational power drives communication development at a breathtaking pace—wired and wireless, space and terrestrial. The RF link, regardless of its waveform, is simply another tool to the computer. No wonder that all communication, regardless of mode, will be digital at a time barely over the horizon.

Thus it is the computer and its peripherals that lead us to better keyboard-to-keyboard potential, high-speed networking and global data transfer, the new robust modes, the exchange of high fidelity graphics and digitized voice in a 500 hz bandwidth. And it provides the magnet that draws more and more new users into the digital world. But don't let all those terms confuse or blur the central issue. Mechanization of communication is precisely **not** what we are talking about. We have grown past the point when the sheer volume of data exchanged by two computers thousands of miles apart awed us. Users now want this power directed inwardly, toward personal and very selfish needs. This means that the goal of all this activity and progress is the radical enhancement of *personal communications*. What people around the world clearly want is the ability to reach and talk to people, not machines, not things; and to reach them from anywhere at any time and at low or no cost; and then, over and above the verbal exchange, to use the power of technology to increase the width and depth of the total communication between the two parties. That is the challenge facing the commercial communication world, as they are invest billions in pursuit of their future market. We must, for quite different reasons, also examine, experiment, then exploit this power in our own use of the digital amateur radio spectrum as well. Read on.

VOICE AND GRAPHICS . . .

the newest frontier in digital

David K1ZZ sums up our current position rather well when he states, "*In general, telecommunications is moving away from being exclusively text and data toward digital graphics, audio and even video. Before long, people will no more remember the pre-GUI interface than they remember what it was like when we used typewriters instead of word processors. In amateur Radio we have been slow to move from text to graphics, and from analog to digital in our communications. This is bound to change.*"

Two examples of emerging technology, based on products available to each one of us right now at a modest price, demonstrate how radically our concept of operation could change in the very near term. Not all the pieces are in place but one dedicated effort could bring either or both to daily use soon. Suppose we retired our keyboards and used voice or a digitizing pad to run our digital station! Far fetched? Listen as **Phil W0XI**, **Charles NX2T** and **Don W6JL** describe how it might be done.

Phil W0XI, who runs Kantronics, Inc., begins by saying that *"I don't think any of the manufacturers will tell you exactly what they are working on for next month. The market is too competitive."* We can only agree for we don't want any trade secrets, just ideas, and Phil obliged in a most intriguing way. *"However, it is fun and perhaps risk-free to think about products a bit further out into the future. Competition is healthy and beneficial for both vendors and amateurs alike. Just look at the prices and features of TNC's today, such as the KP-3. So, convincing my self that it might be both fun and not too dangerous, here goes."*

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"I always have more ideas that can ever be implemented—and many that are not reducible to hardware or firmware! However, let's dream a bit about voice recognition systems and how they might apply to packet radio. The seed for this idea came after reading an article in Dick Ross's PC World, January 1995, about DragonDictate, a voice recognition system. The article described a sort of 'sound card' and sottware combination that would allow computer operators to fully ufilize programs such as WordPerfect for Windows without a keyboard! In theory, once a system is turned on and a menu is present, one can simply say, 'Down cursor, double-click,' and speak other fext.

Now, let's apply this to packet radio and HT's. Imagine that we might be able to build a voice recognition (VR) system into our packet units and add message supervisory firmware as well. The result could be—in the not too distant future—the ability to send packet messages by merely speaking them into an HT-TNC combination. Try this sequence for size:

- turn on your HT and VR-TNC
- speak the combination, "Go to 145.01 please"
- "Send a message to Karl at WK5M"
- "Message: 'Karl, call me tomorrow about the club meeting, Phil'"
- "End message, W0XI"

Here's what the VR-TNC would do. It would tisten to your message, recognize it, convert it to text, parse it into the mailbox, and forward that message to the nearest BBS in standard packet tormat! Just to be sate, we could also have the TNC play back the message by converting the text to audio for 'falk back.' This 'talk back' mode could be used to receive 'packet-voice' messages, too. And with a low-power TNC such as the KPC-3 combined wifh an HT, you could speak packet mail from a remote or portable location, like a bicycle for instance.
Since voice recognition would make packet radio incredibly easy, the demand for this product would probably be very high. While this type of application is futuristic for now, it is certainly possible. For now, however, we just have to dream."

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I assume, from that last comment, that Phil does not expect to have this product in the Kantronics booth at Dayton 1995! But there are other ways to approach this vocal streamlining of the digital process. Voice recognition, in some fields, has become an advanced reality—medicine for example. The vocabulary is very extensive and, once the computer is 'trained' marvelous things happen. Listen to Charles NX2T, who practices medicine in Westchester County, New York . . . and who uses computers in his practice more than most.

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"This article is being dictated to you directly into my computer using VoiceType by IBM, under the OS/2 operating system. My speech translates directly to the computer screen as text. I have to think to dictate which limits me to 50 to 70 words per minute. But VT can translate at speeds up to 100 words per minute, once trained by my voice.
VT has two main modes—dictated speech which appears directly in a dictation window and can then be transferred to a file, another program or a word processor. Or, one can also voice-enable all commands to control programs under OS/2, so that all functions can be voice controlled.

I can also write macros to combine and speed up all kinds ot common tasks. "Take a letter," can be enabled to open a word processor, start a letter with a date, your address and a salutation and open a dictation window. Then my voice will be translated into text in the dictation window for transfer right into the letter."

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How long do you think it will be before someone modifies or improves some existing hardware like the Microsoft Soundsystem or the SoundBlaster in order to operate a digital station without a keyboard? How long do you think it will be before someone runs a RTTY contest hands-off by speaking "F2" . . . "F3" . . . "F7" . . . "F2 and so on and on into the night? How long do you think it will be before we operate our station remotely and chase DX with a telephone call from the office? How long do you think it will be betore the handicapped operator can be as adept at digital as the best of us?

There's more change coming to the front end, though. Don W6JL, a long time Hewlett-Packard engineer, jumps in with a wish based on another kind of technology and very available hardware. Depending on the mode in use, this idea is closer to implementation than most might believe.

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"I am looking forward to the day when, as a normal part of the OSO, we can exchange diagrams drawn freehand or via the computer, with which we illustrate our thoughts, our station layout, antenna system, schematics or gear, or even a map illustrating interesting landmarks near our QTH! Not graphics sent as canned tiles, mind you—I'm talking about real-time interactive 'doodling' to enrich the information transfer during a keyboard QSO. Monochrome, non-grayscale graphics would be entirely sufficient for this purpose. A small scanner or pad (electronic 'etch-a-sketch') comes to mind, connected to the data controller which encodes the graphics information into the appropriate protocol for transmission.

I have had a couple of QSO's in which we exchanged graphical information via telephone FAX during the chat. This gives one an idea of how neat it would be to be able to do this as part of the HF link. By limiting the size ot the tablet's active area, by minimizing the data rate, acceptable drawings could be sent in a 500HZ bandwidth, the same as used for the textual data. We could fill out our QSL cards real-time (one thing I have done via FAX during a OSO). Incidentally, using the FAX within a OSO is a little sobering. The toll charge is a staggering 30 cents to send two pages of detailed information about our shacks and rigs, including a photograph and a QSL card!"

Over 25 years ago, while I was in graduate school, I was able to take engineering courses via videotape without leaving my workplace. We also had a small 'etch-a-sketch' analog pad, connected to the phone line. We could communicate directly with the instructor while talking with him via voice on the phone. The pad generated variable frequency tones which, when decoded at the other end recreated the free-hand writing on a display. Thus we could write equations and work through problems with the instructor using this technique. This was a quarter century ago!"

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The concept of transmitting handwriting is surely not new. I remember working in the Denver Montgomery Ward mail order house in 1947. We were on the 8th floor. On Friday nights, when the retail store was open, I had the good fortune to sit by a row of big ledger carts and a machine called a TELAUTQGRAPH. It was a hard wired link to the retail floor, a pen (really a tracing stylus, ala Thomas Jefferson) and a big roll of paper. Up from

the retail floor would come a request for credit approval. I would dash to the appropriate cart, check the individual's account and write a quick "okay" or "rejected." Not quite up the speed of a modern data base, but, remember, this was 1947 (and this was the company who had the stock pickers in the warehouse skating on the latest in roller skates!).

There is a way to fill Don's request even now. Sitting right next to this notebook computer is a 5X7 inch digital pad by Wacom, using Dabbler software. I can quickly sketch a small diagram, save it as a BMP file, put it into Express, compress it and send it on its way. [2]Dabbler is capable of producing outstanding works of art in full color, either water color or oils, and is serious overkill for this need. It deals only with huge files. A typical painting is 500K after compression! The sketch about 50K. But this low-priced pad is connected to an RS232 port just awaiting software more appropriate to the task. Who knows, it may already exist. Incidentally, the digital pen is a better mouse than most mice!

There is no time nor inclination to forecast what will happen to our computer hardware environment over the next few years. All we know is that it will be a continuation, perhaps even an acceleration of what has been seen in the last few years. New chips, bigger drives, serious multi-media, unified operating systems and faster, faster, faster and cheaper, cheaper, cheaper. And smaller, to the point the notebooks of 1998 may totally replace the space-wasting boxes we consider normal today. They already have at this location. **Bill K9GWT,** the head of HAL Communications, Inc., feels that . . . *"The performance of digital hardware improves every year. PC speeds double every 18 to 24 months, memory cost per kbyte decreases every year. There appears to be a new and faster PC model available every six to nine months. However, new models tend to have the same price as the ones they replace, but with better performance or more features. DSP system costs are also disappointing. The price reductions promised three years ago have not materialized. As with PC's, new DSP models have more power but the price also goes up. So, from strictly a market viewpoint, we can expect digital radio system performance and features to increase each year, but the cost of a typical system will probably stay at or near today's level, and may even increase slightly."*

In passing, note that the peripherals are dropping like a lead balloon: 28.8K modems are now at or under $200, color scanners below $500, color printers below $500, gigabyte disk drives for under $375—to mention a few pieces of external hardware that are useful in a multi-media digital ham shack. Each one promises to impact your style of operation over the next few years.

OS/2, WIN95, WINNT & UNIX . . .

there are choices even now.

Operating systems deserve a passing comment. No attempt will be made to assay the range of developments coming up in this basic area. Suffice it to say there are decisions we face in the very near future. We do have options even today, genuine options to DOS and Windows 3.1. OS/2 (Warp for Windows) and Windows NT are here now and available at your corner computer store. Windows 95 is not far away. Each leads us, albeit by different routes, to the world of 32 bit processing, true preemptive multi-tasking. All of this will be discussed in future issues of the Digital Journal. For now, listen to two operators who see the potential of the coming operating system revolution.

Tapani OH2LU summarizes the issue: "The potential of 32 bit applications in amateur usage has barely been touched. The current PC hardware is almost exclusively 32 bit, but the applications are almost without exception 16 bit in nature. The sizable computing resources on the desk top are not utilized."

Charles NX2T goes a bit further because he stepped into the next generation operating system without ever pausing in Windows! Now a serious OS/2 user, he thinks highly of the benefits of 32 bit processing power. *"OS/2 is superb and under-utilized compared with Win3.1. It is much easier to use, to customize for any particular need and will run DOS, Windows and OS/2 programs all at the same time. It is multi-threaded—one program can run a communications program as an example, while another runs a spreadsheet, yet another a word processor—all at the same time. Warp has TCP/IP access to the Internet built in. I use the IBM equivalent of Mosaic and it's fascinating. Every time I double click the icon another copy of the program is opened. This allows me to explore multiple places on the Internet all at the same time and over only one phone line."*

I recently installed Windows NT on the big Toshiba laptop computer. For the most part it is wonderfully improved Win3.1. The first and most obvious benefit is getting away from the resource limitations of Windows. In NT, you can open all of your programs and have them on the desktop. For those power users, please note that NT will address 256 serial ports! There are minor problems. The most awkward—there is no 32 bit driver for the Hal PCI-4000 quite yet, so I must get out of NT and return to Win3.1 to get on the air. Some programs won't perform under NT and, finally, some hardware is not yet able to work with NT. But all these little problems will go away over the next few weeks or months, so I plan to stay with this powerful system. And you'll hear more about it, Warp and Windows 95 in the near future.

IN BETWEEN . . .

there is a mismatch between software and hardware.

The dramatic decline in the cost of processing power and the hardware we attach to those boxes underscores the naked truth about the other half of the equation. Software remains mired in second place, two or three laps behind the hardware it is supposed to control. For the most part, the cart is well ahead of the horse. Oh, the basic programs are bigger and faster and have more (perhaps too many) gadgets and doohickeys imbedded in their menus. The leading commercial program's price fell sharply. But, particularly in the field of amateur communications, we lack great breakthrough executions of sparkling new ideas. The economic incentive is not there, perhaps, but I counter with the argument that we have some of the world's best software creators within our ranks. And if we can but get their attention we might be amazed at what might be in the offing.

Peter TY1PS, the creator of Express 2.04 (soon 3.0) ranks in the top tier of our software gurus. In his scenario for the next few years, software as it relates to amateur radio finally comes of age. His point is basic—we don't need any more computing power in add-ons or in radios, there is more than enough in the desk top. Sophisticated software, utilizing all of that power, in combination with a little thing called a DSP is about to revolutionize the way we communicate. Fasten your seatbelts!

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"I am lucky to be involved in digital modes for a die-hard CW'er would probably have little to say. Digital radio is and has always been on the edge of technology, and a lot of our fun is somewhere grounded in the never ending challenge of keeping track of the latest developments. We are one of the few groups of amateurs in the world who still do a lot of experimenting, research and even inventions. Surprised ? Maybe you are not looking at it in the right way. Experimenting does not necessarily mean that we are taking the soldering iron out to glue some parts together. No, digital experimenting these days involves other skills. Didn't you try to run Lan-link, the DX-Cluster and your favorite game

simultaneously under OS-Warp on your brand new PC ? You may not be aware of it , but most likely you are the first to try this combination. You found out something new! That is experimenting! And because of it digital will move ahead into a most interesting future and we will all be a part of it.

First, let me ring the death knell for our beloved Multimode TNC's. We are already about to switch from multimode operations to let me call it 'Anymode' operations. The key is the fabulous little circuit called a Digital Signal Processor (DSP). We already see them appearing a bit everywhere. Recently the prices ot these little wonders dropped into regions below $50. Soon we will see them whenever we need to make tones out of our data so that we can transmit with our radios. All new modem designs will be DSP based, not only because they are superior to classic analog circuits, but also because they are a lot cheaper. This will be the end of the good old TNC concept.

Our modems will lose their personality. Instead of stand-alone circuits that contain all the support necessary to run the different modes, they will merely be signal generators and analyzers, nothing else. Think about history: we needed these TNC units because we had nothing but a terminal or a pretty dumb computer at hand. But now we have plenty ot computer power on the desktop. All we need is to transform the data into tones, tones into data— and DSPs master in that function. All the computational tasks involved in the actual modulation and protocol levels can be done by our computers. We will stop investing our hard earned francs, dollars or marks in a $1000 DSP modem that is expensive because it contains the complete circuit of a Macintosh on the board inside the box. We now find ourselves restricted to the modes the manufacturer decided to add to his toy. We soon can have the same result and even more with a $99 DSP kit and some free software.

Some sound cards have DSPs and we already make use of it. Soon all PC's will have DSPs for integrated modem and multimedia applications. There will be no need to buy a radio modem, all we need will come with our PC's. Modem makers take note, that is the way we are going! Finally, digital will be affordable to everybody and bring many newcomers to our ranks.

There is more. No more QRM! Our dream will come true!! The new circuits not only are superior in creating fancy signals, they also beat everything when it comes to analyzing them. Upcoming software designs (yes I say software designs, because the hardware will not matter any more—DSP is DSP and it may sit on the board, soundcard or outside in a modem) will make more use of these capabilities. They will actually listen to the band and place their tones only where there is silence! We won't have our signals on a fixed point anymore. Soon the MBO's will announce: 'Receiver bandwidth of TY1PS is 2.4 KHZ above 14064'. The calling station will find itselt a free spot in that range and place the signals there, even move the tones when required!"

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When software engineering reaches this level and combines with new programmable hardware, wonderful things happen. Tapani OH2LU sees the same bright future for the DSP technology but sees it as "*not yet affordable for amateur use.*" Despite today's current obstacles including price, I have not the slightest doubt that much of Peter's forecast will become reality, perhaps sooner than we think. But we shouldn't leave the software subject without a comment or two about the quality of today's product. Leave it to Fred and Don to point at some of the frustrating issues we face today.

Fred DK4ZC lays it on the line. "*I want a program that will work right from the beginning and which will not give me the feeling that I am a beta tester, even though I have paid a lot of money for it.*" Don W6JL has a related complaint. "*Right now it seems that every Tom, Dick and Harry has his own set of Soft Keys, multinested menus (some with bilious colored screens), ad nauseum. More standardization is doable but probably will never happen, given that it requires software developers to actually communicate with each other! The movement toward Win3.1-based menus helps somewhat.*"

Another point-of-view from our Illinois writer Bill K9GWT. He accepts the radical development of hardware and systems. But also sees the pitfalls that are touched on in the comments above in a slightly different way.

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"As advanced as our modulation, protocol and hardware technology may be or become, there is one area that needs a LOT of work—user interface. We can have the best technology but it's of little value if it cannot be easily used. Modems, protocols and computers are **tools** for communications. They need to be easy to use, ideally as if they weren't even there. We call that transparent! Unfortunately, the way we engineers first introduce new gadgets is usually anything but friendly. If our latest invention doesn't have at least 27 knobs and/or 127 software commands, it couldn't possibly work! Who says? Speaking as a user, what I really need is on command—GO. Maybe, STOP as well, but I can always pull the power plug. How many TNC users really know or understand even 10% of the TNC command set? Who cares? The point is that, as wonderful as all of our present high-tech data gadgets may be, interface to them has been designed as an engineers toy, and not as a tool to enable communications. In defense of my fellow engineers, I must quickly point out two major causes for this problem. First, the new gadget is often so new and revolutionary that the relative trade-off between 'similar' new features cannot be easily determined. In this case, the safest and best approach is to invite the user to try all variations and pick the 'best' choices. Second, users need to take a more active role in how their interface is produced. That means to help write the software, not just complain about it!

It is therefore my humble opinion that the **most** important short term future development for the digital modes is the evolution of simple user-interface software. This effort has already begun by W5SMM (Winlink), W0RLI (BBS), TY1PS (Express) and KE5HE (RagChew). On a more optimistic note, I do believe that sottware will become 'friendly' to the point that the user will no longer need to know or even care about set-up parameters and TNC mode commands."

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MODES . . .

and the futures narrowed bandwidths.

"*We need better protocols for use in low data rate keyboard-to-keyboard HF communications under weak signal conditions. I believe there is altogether too much emphasis on high-throughput modes. . . and not enough on personal real-time communication. For me, ham radio's continuing magic is heavily wrapped up in the satisfaction of personal communications, world-wide, person-to-person, with no intermediaries except mother nature and the vagaries of the atmosphere. That is what HF ham radio is all about.*" So says Don W6JL. How do we get there trom here?

Sometimes the least is most. And, if Gin JA1ACB is correct, the oldest is the newest and best. According to **Chiru JA3DLE/1**, Gin is planning a new mode—"*but it is a very old-fashioned one. He would like to try CW-RTTY. That means to use only one tone for on-off Baudot.*" And he expects to get very high quality results on the band because ot the narrow bandwidth. In a word, Gin wants to experiment with something akin to Coherent CW, a mode living within a 9Hz bandwidth! (He is not alone. After reading the the first CCW column in the Digital Journal, Jim KE5HE has some interesting thoughts about its application to our digital art. More on that later.)

Fred DK4ZC is another member of the narrow-band school, "*With knowledge about FFT (see Fred's article in this issue) and DSP a modem can easily be fitted with much narrower filters. Clover needs 500Hz for four tones, or 125Hz for each tone. So, when we have two tones like Amtor or Pactor 250Hz or less is quite enough.*" Then he, too, refers to Coherent CW and the lesson it teaches us about putting our signals on a diet.

Bill K9GWT join in with two most interesting statements, "*HF sub-bands will be redefined in terms of* ***occupied bandwidth*** *rather than type of information (voice, CW, etc.). Bandwidth inefficient modulation modes such as SSB will be discouraged in favor of the more efficient modes like Clover. Furthermore, regardless of the type of data source (voice, sound, image or computer file) all information will be sent using error-corrected digital techniques*!"

All the comments above direct themselves to the reality of band condifions today. The directions are legitimate answers to a basic need and should be explored. Peter TY1PS' returns with an alternate vision suggesting thaf we may wind up with a portfolio of software created and controlled modes. **Dial-a-mode** software could give us the optimum combination of modes for any band condition. While it sounds revolutionary, the fechnology is here, now, awaiting the appropriate (and appropriately priced) software harness. What a team we would have fhen!

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"The many ways we have to modulate our signals these days are but the beginning. Remember what I said before: we are experimenters, and as such we will come up with a better way to chirp every now and then. With the DSP and computers at hand it becomes very easy to create new modulations of every form we can imagine. Whereas programming DSPs looks today like something only the big specialists can do, I am confident that very soon it will be feasible for everybody. More and more development kits appear, and we will soon see the kind ot tools around that allow everybody to teach these circuits to do the fanciest things. Just think of what Visual Basic did to Windows programming, and you know where we are going. The time will end where a manufacturer 'creates' a mode and 'sells' it, keeping some secret mystery about the inner workings. This was a development that started some time ago, and will hopefully end soon. The new technologies will free the digital experimenter and operator from the hardware of the manutacturers and put development back where it used to be and belongs: the hands of the amateurs. The DSPs will learn to detect all these many new modes, and switch their programs to the current modulation. We wonf need to buy new hardware for any new mode coming up, just add it to our software library.

On a different but related note, we waste a lof of our precious specfrum with unnecessary chirping and twiddling. Our signals occupy something like 500 Hz bandwidth, with 100+ baud's speed while some slow chatters type a character every half a minute. What we need, and if will come, are new true-adaptive modes fhat change bandwidth depending on fhe traffic. Think of a new multitone wave form. When we chat, a single tone of 50 Hz or less will be used. As soon as we start to send a file, more and wider tones are used and speed increases. These tones don't even have to be side by side tor they may automatically find and use any free spot within the radio bandwidth and place some tones there."

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We think all too frequently only of HF. Yet, in this new world we will no doubt cross boundaries and it may well be that the "broad band" of fhe Internet and on that rarely used land above 1240 Mhz will pair up and deliver some startling achievements. We know that Internet will soon deliver "movies as good as TV, voice as good as telephone through interfaces as easy as a toaster." Listen again to David K1ZZ who points out that we will follow the same path, and that there is a way to do it.

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"Bandwidth requirements will push us to the bands above 1240Mhz. Not to discount the good work of the cutting-edge experimenters, but for mainstream amateur operation the reality here is likely to be what we adapt for our own use from technology that has been developed for non-amateur applications. For example, the availability of inexpensive 2400Mhz hardware designed and marketed for nonlicensed Part 15 use will make this band the home of amateur megabit links. (One watt generated at the focal point of a dish antenna is a pretty potent signal!) This is the next logical technical development, simply because the hard part has already been done for us. Now that it looks as if we're going to retain the 2400Mhz allocation, it's time to make greater use of it.

For amateurs in isolated locations, HF and amateur satellites will provide the links albeit at slower (voice bandwidth or less) speeds. Developments here will be driven by the desire to capture ever-weaker signals in an ever-noisier environment. There are some fine opportunities here for original work by amateurs in improving `the interference resistance (including fading and noise, as well as to other signals) ot digital communications. DSP holds considerable promise, particularly if implemented at IF rather than AF. Also promising is the use of electronically steerable receiving antennas to null out interfering noise and signals. We know trom experience that the first to adopt these improved techniques will be those amateurs who are driven by competitive interests; contesting and DX-ing. There is much to be learned from competition that can improve our day-to-day communications capabilities, if we but pay attention."

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TRANSCEIVERS . . .

wfll they ever catch up with the computer?

The sad fact is that the RF hardware side of our shack lags far behind the changes at the front end. Think for a moment about the mechanical clunkers WA3ZKZ wrote about in these pages over the last three months. A small handful of years later our average installation (perhaps that 486/33 $1295 package mentioned before) is light years beyond the teletypewriters. Yet the basic radio used by Crawford ten years ago to handle the output of the massive Lorenz machine remains essentially unchanged. For all we know he may be using the same unit!

The RF side of the daisy-chain we call a digital ham shack is in a static (and I don't mean QRN!) mode. Development focuses on miniafurization and bells and whistles. This is not quite what Fred DK4ZC had in mind when he described his ideal rig—"*I want a transceiver like my FT990 showing the frequency in Hz steps and having an output of 50 watts. I do not need an antenna tuner, no second VFO, no speech processor, no noise blanker and I surely do not need 99 memory locations for my favorite frequencies.*" But try to buy that rig, in the US or anywhere else in the world.

Bill W9GWT suggests a very basic change in the number of boxes we have sitting around the shack when he says, "*At some point in the next 2-10 years, the HF receiver and transmitter exciter will become a plug-in assembly in the station's computer. The antenna will plug directly into the computer chassis. And an increasing portion of our digital communications system will be moved into the computer's software as well. Modems are already plug-in elements of the computer.*"

Don W6JL touches on the problem as well and begins with the reasons why progress is so difficult. While we can all agree that the customer should always be right, or that the product must meet the needs of each customer, there are legitimate constraints.

"One inhibitor is that digital operation

makes up a small percentage of ham radio activity. SSB and CW still attract much larger numbers. Perhaps the digital modes will continue to grow. If so, this will force the inclusion of more digital features. Manufacturers do not hesitate to exclude anything that does not address their target market. In the 1970's, Kenwood included FSK (with automatic power reduction and CW filter selection built-in) in their 820's. But later rigs—830, 430 and 440,s—had no FSK capability at all, even though these models were more expensive. The cost of the FSK components is probably under a dollar or two.

There will be improvements, but my personal view is that much of it may not become available to the amateur community in a form which is flexible and adaptive. One reason is the declining technical abilities (and interests?) of the average ham. Rigs are likely to continue to be more toy-like. Even now, I notice the trend to calling rigs, 'radios' (remember when that term was reserved for BC receivers?). What good does high-performance equipment do if the average ham does not know enough about its operation to use it effectively? There will be a tendency to design rigs with fewer controls, less flexibility—products more like the average consumer electronic product. They will tend to emphasize 'idiot proof' operation, just like point-and-shoot cameras that promise 'perfect pictures every time.' The limited volume of dedicated amateur equipment does not capitalize fully on the economies of scale such as exists in the consumer electronic field. This low volume translates into high prices. Imagine what a VCR would cost if sold in quantities that match our amateur equipment.(And this surely impacts the availability of basic improvements like better filtering).

Performing complex tiltering on the recovered audio signal is inherently limited in effectiveness if the ORM already is present in the IF before the detector. This requires DSPs with a sufficiently high clock rate to handle at least the lower IF frequencies, say 455KHz. RF DSP is now being done in commercial and military equipment where the cost can be justified. Even lower cost equipment, such as GPS receivers, are using DSP filtering and data recovery at their receiver's IF frequency, sometimes at the high end of the HF spectrum (30 Mhz or more).

With all the microprocessor power in modern rigs, there is no reason why the audio-based multimode data controller function cannot be included in the transceiver. The firmware can be made upgradable via RS232 download from a PC, using internal Flash memory. This is being done today in some consumer products (although the capability may be hidden from the user) and requires no new technology and uses low cost off-the-shelf components. Even the complex FSK demodulator circuitry could be much more integrated than it is today. Think of the cabling complexity and affendant RFI problems (all too evident in the signals I hear on the air daily!) which can be eliminated by taking this step.

Another logical step is the selectable automatic power control for the data mode being used. It could be included using dynamic power control based on real-time error rate in a given QSO. I have worked at least one ham on the air who has implemented this feature with his own simple circuits. The results are interesting for many times a power of 1 watt or less (!) is required to maintain a data communications link. I have verified this by varying power manually during my own operations. This can surely help minimize unnecessary QRM! This capability exists, only the simple interfacing circuitry needs to be included in the rig."

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Now, if we could combine automatic power and automatic bandwidth adjustment we would have the beginnings of the perfect digital operation. It will, in my humble judgment, become a reality because of the sheer necessity of such a product. How else will we survive without as **Nick N4SS** suggests (with only a slight smile) "*taking spectrum away from SSB as well as CW!*" If necessity is truly the mother of invention!!

But even with the ideal transceiver design, we cannot run away from our problems on this front. "What's wrong with our transceiver?" is less the question than "What's wrong with the way we use it?" Part of our misbehavior stems from inadequate manuals, part from poor on-the-air "Elmering," but the largest part traces to our tendency to neither know nor care about how we tune our rigs. David K1ZZ speaks out on that score.

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"As to my personal wish for improvements, I have two very simple ones. First, that we clean up our HF digital signals. We have to do better than just dumping an audio signal into the microphone input of a typical SSB transmitter. It you listen critically to HF digital signals you can hear carrier and unwanted sideband emissions sufficient to cause harmful interference to the reception of weak signals several kilohertz away. And second, that we use appropriate IF and audio receiver filters for HF digital operation. Except for rank beginners, there is no excuse for using an SSB-bandwidth tilter to receive a 500Hz wide (or offen less) digital signal. Many complaints about interference and crowding simply reflect the use of inappropriate receiving equipment (including non-directional antennas)."

To which we add, **AMEN!** We simply cannot continue to pollute the bands with bad signals or waste spectrum with typing speeds of five words a minute using a robust mode capable of twenty or more times that speed, one that takes up 500-1000Hz or more of our very limited space. There is nothing wrong with five WPM. Some can't or won't type any faster than that. So be it. However, such speeds must then move in a small fraction of today's bandwidth! Gin JA1ACB is right, off-on RTTY in a 9Hz path would solve many of our problems! The sooner the better.

And on that provocative note we bring to an end Part One of this look at our future. There is much more to come next month when we look at our Environment, Operations, Public Service, Networks, Antennas and all the other interesting facets of our wonderful digital world. Don't miss it. And if you have an urgent comment to make regarding the issues raised here, please send them to Jim N2HOS at CIS 71573,1077 or FAX 813 596 7473. Once again, our very special thanks to all those who so willingly contributed to this series. We are in your debt.

[1] Please note that David K1ZZ, Executive Vice President of the ARRL, is expressing his personal opinion and not that of the ARRL or any other ARRL official. We especially appreciate David's contribution. It was done under a severe time handicap since George W4OYI, ARRL President, suffered a stroke on February 11th. We wish George a swift recovery. According to K1ZZ, "It will be a long road."

[2] The file was sent the day after this was written. It moved via a Clover link with TY1PS, using Express 2.04 software. It could easily be accomplished in real-time on top of the continuing keyboard exchange.

SOFTWARE UPDATES

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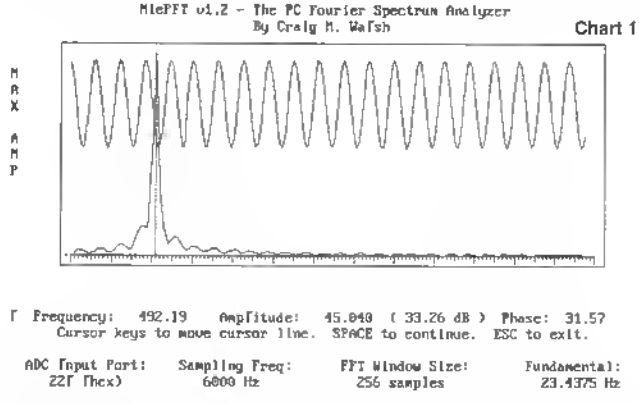
Spectral Analysis of Digital Signals

using the MicFFT program[1]

by Fred Salzwedel, DK4ZC • Weifaer Str 4C • Steinegtwolmsdo, Germany 01904

During his life the French mathematician Jean Baptiste Fourier could not know that the mathematical procedure he developed would be used in today's electronics to analyze among other things the spectral purity of sound signals. He developed it to research temperature motion. The method was named after him and became known as Fourier transformation (FT). To describe mathematical formulas such as the FT, it is necessary to understand them yourself before making any attempt to explain to others in a concise way. Because I am not a mathematician, I will not even try to do it. Instead, I will use sample Chart 1 to explain



what can be done with FT. You can see 2 signals in the graph. The upper part shows a sinus curve, whose amplitude changes during the time between a minimum and a maximum. Feeding this curve into the Fourier transformation results in a display as seen in the lower part of the graph. In the best case this will become a steep raise and declining peak, that no longer has the time on the X axis but rather the frequency. You can already see it on the sinus display, but after the FT you can clearly distinguish a couple of harmonics. This illustration shows the carrier of my old FT757GX.

Nevertheless, FT is a bit more complicated as described so far. the curves are made up out of 256 distinguished values. It would be possible to calculate the values one by one with the help of a pocket calculator to display the FT curve. This would of course take too much time to correctly display pulse type signals as we find them in our digital radio signals. That is why, based on the Fourier transformation the fast Fourier transformation (FFT) evolved and a computer is used for the calculations.

The MicFFT program.

There is a program that is making use of the FFT called MicFFT. It was written by Craig Welsh, a student from Los Angeles for the purpose to check out his Hi-fi Stereo if it comes up to specs. There are several FFT programs around, but this one has the advantage of being freeware and thus can be obtained and used by everybody at no cost. I pulled it using Clover out of Peter's (TY1PS) HF-mailbox in Cotonou / Benin. That took me 20 minutes, by mail it would probably have taken 20 days. To run the program a soundcard like the Soundblaster is required.

In his description ot his program, Craig calls a sinus curve as being pretty boring because there is not a fot to see in the FFT. It is getting much more interesting when you connect a microphone to your soundcard and sing a strong "OOOHHH." We all know this tone, as we use it to tune up our transmitter or the antenna tuner.

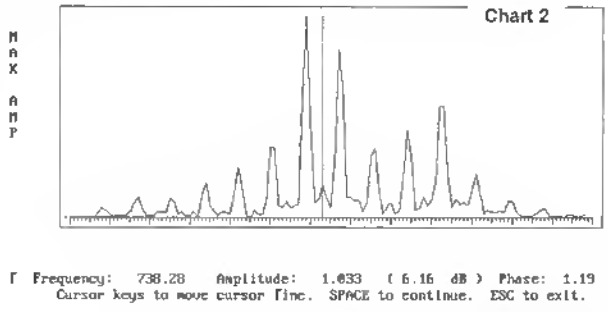


Chart 2 shows such a tone as a sinus with several incisions. MicFFT displays this tone as a multitude of signals that alf have the same distance in frequency. In the center of this aggregation of signals, a vertical dotted line can be seen. At this spot the frequency is 785.16 HZ as indicated below. The amplitude raises to 23.81db at this point. With the scale starting from 0 Hz it is easy to calculate the distance between the distinctive maxima. It is about 129 Hz.

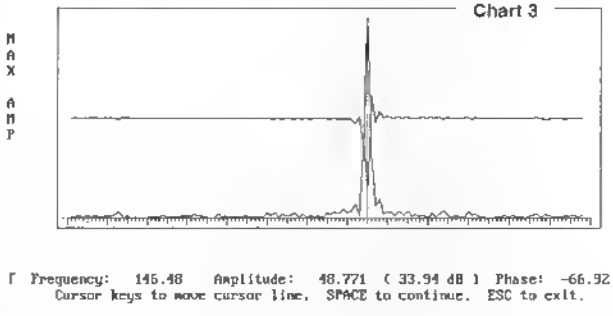
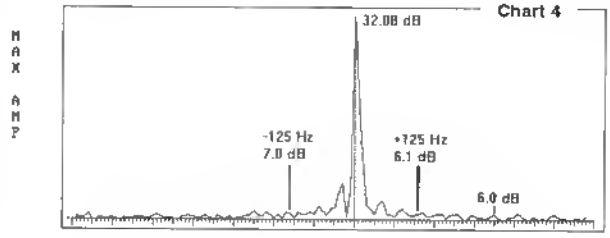


Chart 3 shows the phase of a 146 Hz tone. At the cursor position the value is -66.92.

Signals on the 20m band.

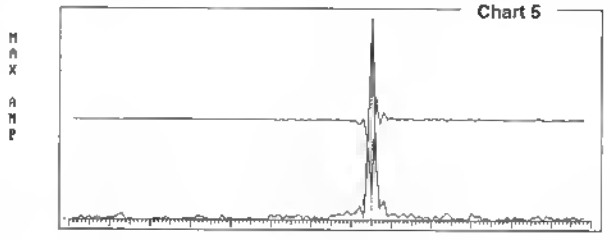
We used the first 3 graphs to illustrate the way MicFFT works and the possibilities offered. The following graphs were obtained by analysis of digital signals on the 20 m band. Foremost however, the limitations of this setup shall be summarized. As mentioned above, a soundcard is required and that, as the name implies, can treat sounds. The limit ot tones that can be handled is at the upper frequency limit of the human ear or in the lower uftrasonic range. As we receive tone signals from our radio receiver, the tone spectrum is necessarily within the bandwidth of the filter used. I always used the SSB tilter in order to analyze the widest possible frequency range. Soundcards have a fixed dynamic range depending on their construction (Signal/ noise ratio). This means that distortions that are weak compared to the primary signal cannot be recognized. My soundcard is a 8 bit device and has a rather low dynamic range. On the other hand, we can expect that the distorting signals that are visible in the

graphs are audible in the receiver and disturb the primary signal. As mentioned before, the MicFFT program was developed to evaluate the quality of hi-fi sets. For this purpose continuous tones are used. When digital radio signals are analyzed, only pulsed signals are available. Therefore we may not always immediately obtain a good measurement. Some patience is required and the signal sampling sometimes needs to be repeated to obtain good results. This does not cause any major difficulty as each reading only takes a couple of seconds. The described arrangement can not provide the same quality as delivered by professional and very expensive spectral analyzers.



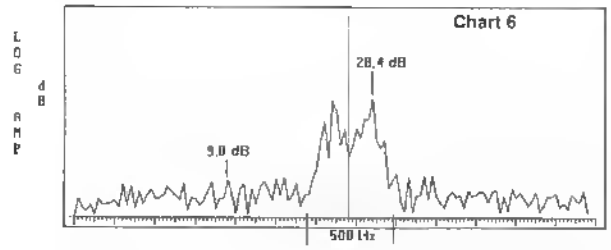
[Frequency: 546.88 Amplitude: 39.201 (32.0B dB) Phase: -54.72]
Cursor keys to move cursor line. SPACE to continue. ESC to exit.

Chart 4 shows a CW signal. The edges of a 250Hz filters are marked in the graph. The signal had a level of 32 dB, noise is at 6 dB.



[Frequency: 146.48 Amplitude: 48.771 (33.94 dB) Phase: -66.92]
Cursor keys to move cursor line. SPACE to continue. ESC to exit.

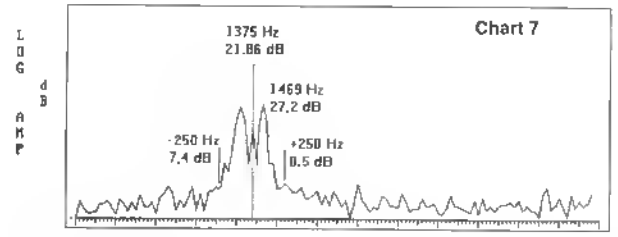
In Chart 5 we can see an AMTOR signal. From the two frequencies for the tones displayed, the shift can be calculated at 223 Hz. Interesting in this picture is that the mark and space tones split up into three distinct signals (triplets). This phenomena is used by scientists to detect the structure of molecules. The amplitude in this graph is on a linear scale.



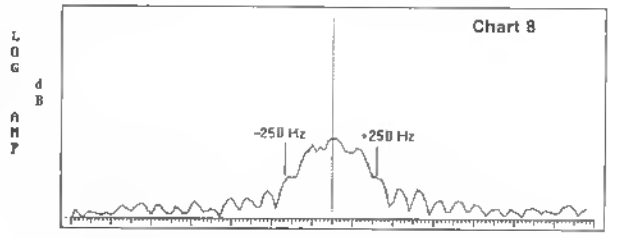
[Frequency: 1593.75 Amplitude: 4.496 (14.00 dB) Phase: -4.57
Cursor keys to move cursor line. SPACE to continue. ESC to exit.

Contrasting to 5 the AMTOR signal in Chart 6 is recorded on a logarithmic scale. With the signal at 28 dB the noise appears at the 9dB level. Here again the triplets can be clearly seen.

For those OM's who enjoy connecting to a DX mailbox from time to time , Chart 7 is sure of interest. You can see there the Pactor signal of VK2AGE on a logarithmic scale.

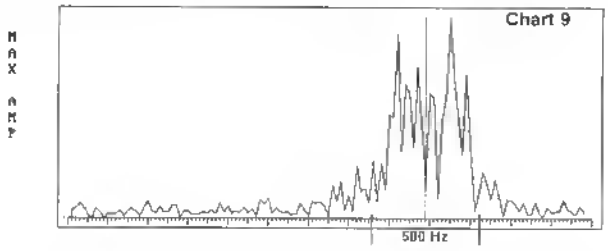


[Frequency: 1375.00 Amplitude: 11.132 (21.68 dB) Phase: -15.20]
Cursor keys to move cursor line. SPACE to continue. ESC to exit.



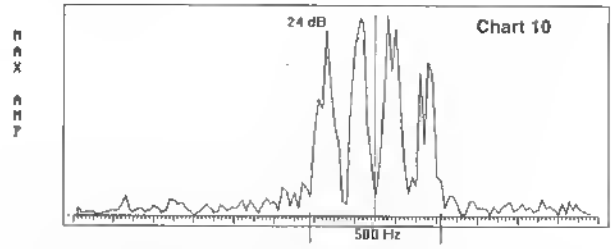
[Frequency: 1523.44 Amplitude: 8.070 (19.15 dB) Phase: -9.82]
Cursor keys to move cursor line. SPACE to continue. ESC to exit.

I recorded the tone spectrum of Chart 8, because this signal got my attention due to its very high noise distortions. Those of you who read the Digital journal will recognize the same spectrum on page 5 of the august 1994 issue, there coming from a professionat spectrum analyzer. Interesting is that a Pactor signal has a third maximum between the mark and space tones.



[Frequency: 1738.28 Amplitude: 3.537 (13.14 dB) Phase: -4.91]
Cursor keys to move cursor line. SPACE to continue. ESC to exit.

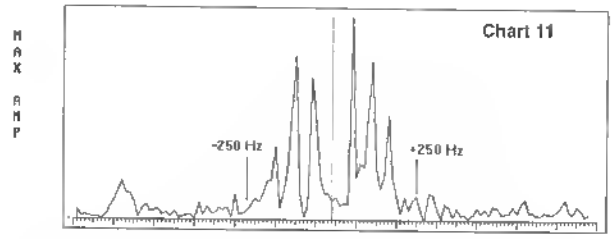
A HF packet signal has very large bandwidth, as can easily be seen in Chart 9.



[Frequency: 1171.88 Amplitude: 1.836 (6.18 dB) Phase: -1.41]
Cursor keys to move cursor line. SPACE to continue. ESC to exit.

Chart 10 shows a rather infrequent digital signal. It originated from the Clover mailbox of TY1PS. it can be seen that Clover uses 4 tones that fit into a window of 500HZ. The tones have a distance of 125Hz each.

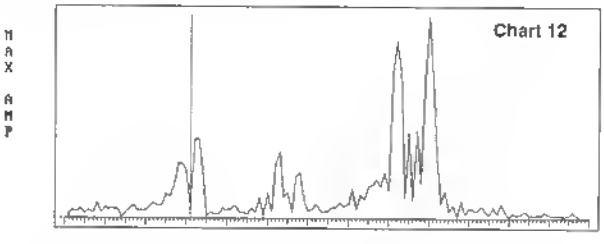
I will conclude the row of digital signals to be currently heard on the HF bands with G-Tor. Chart 11 shows such a signal. The spectrum is basically the same as an AMTOR signal.



| Frequency: 750.00 Amplitude: 1.703 (0.64 dB) Phase: -0.28 t
Cursor keys to move cursor line. SPACE to continue. ESC to exit.

QRM on the 20 meter band

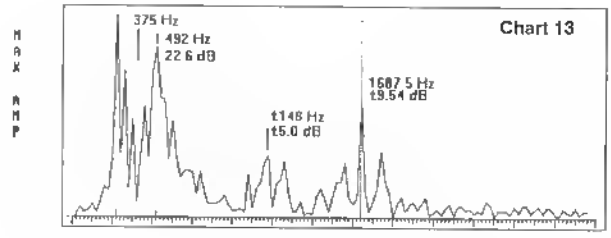
In the previous illustrations, I showed the spectral displays ot various digital signals, none of them giving cause to any criticisms. Some of them are maybe a bit broad and may disturb weak signals on neighboring channels. This is due to the technology used and there is little the operator can do about it. A completely different situation arises from stations that operate with overdriven input circuits or even the voice processor activated. Incorrect connections between the computer, modem and transceiver, as well as bad or missing ground connections can lead to similar results. Charts 12, 13 and 14 illustrate such signals. They all have in common that they carry secondary carriers that are 600, 800 or 1300 HZ away from the carrier frequency. The more distant signals always show a higher amplitude then the closer ones. The signal that appears 1300 off the main carrier is only 6db or less below the main signal level. It can be easily seen that no traffic is possible between stations that are of similar or less signal strength as far as 1500 HZ around the disturbing station. In some case, as shown in picture 14 for example, it was even possible to read the station on the disturbing carrier 1300 Hz away from the main signal.



| Frequency: 726.56 Amplitude: 0.799 (5.00 dB) Phase: -0.13 t
Cursor keys to move cursor line. SPACE to continue. ESC to exit.

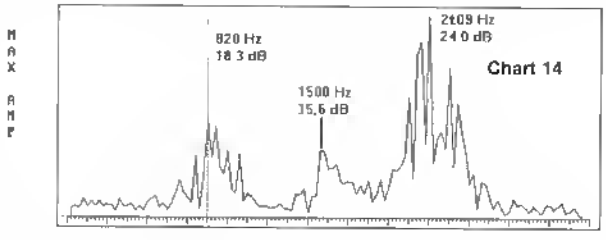
The spectrum of Chart 12 was created by an RTTY station. The spectral displays of Charts 13 and 14 came from a DL3 and a I5-Mailbox. A 4X MBO delivers a similar signal. There is no need to show this again. I addressed messages to all concerned mailbox operators in order to draw their attention to their bad signals. In two cases, I encountered strong hostility, claiming that the transceiver and PK232 are brand-new and it is therefore impossible for them to cause ORM. In addition the sysop accused me of being an intruder and to better leave this frequency!! None of the 3 stations made any effort to improve the quality to their signals during the last 6 months since the incident.

Mailboxes have to transport large amounts of data and are therefore heard on the bands for extended periods of time. Signals that are not clean coming from these stations are to be seriously criticized. Fortunately only a few stations are not technically up to date. The vast majority of digital stations operate without causing problems to their fellow band users.



| Frequency: 1687.50 Amplitude: 0.489 (+9.54 dB) Phase: +0.83 |
Cursor keys to move cursor line. SPACE to continue. ESC to exit.

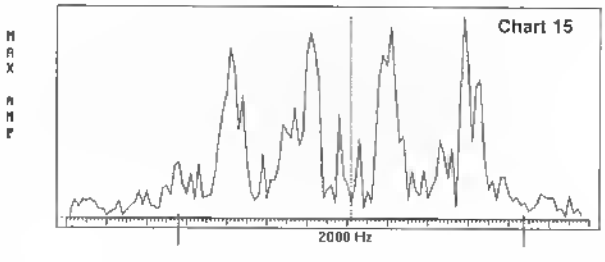
Under these circumstances let me give you a little tip : You should check your own signal at regular intervals with the CW filter of another receiver. If you don't have a second receiver. your



| Frequency: 820.31 Amplitude: 7.345 (18.43 dB) Phase: -4.95 |
Cursor keys to move cursor line. SPACE to continue. ESC to exit.

QSO partner will surely be happy to tune around your frequency and give you a report.

To terminate the series ot images, I present the spectrum of an uninvited guest who pleases us with uninterrupted RTTY on 14061 (Chart 15). I am unable to identify or read this station as an unknown code is used. The strongest signal is obtained here in OH land with the beam pointing north east. This incident raises the question . . . what can be done legally to protect us from band intruders. One solution is to setup a schedule with your OSO partner at the troubled frequency. You then meet with your OSO partner on this frequency shortly before the intruder shows



| Frequency: 1664.06 Amplitude: 0.814 (5.17 dB) Phase: -1.09 |
Cursor keys to move cursor line. SPACE to continue. ESC to exit.

up and then keep up your QSO, even when it may become very difficult to do so.

I would like to thank Prof. Dr. Dr. Cuno (DL2HC) for discussing and evaluating the graphs obtained with MicFFT. Without his valuable assistance this article would not have been written.

[1] The MicFFT program was written by Craig Welsh and is available from the ADRS BBS. A tutorial for the program will appear in next month's Digital Journal.

The *NEW* PacComm PicoPacket

Compact! Only 1" x 2.5" x 3". An inch shorter than a pack of cigarettes.

Powerful! Z-181 high integration MPU with one megabyte address space.

Inexpensive! Only US$129 (32k RAM model).

Perfect Beginner's TNC! Every feature you would expect in a 'normal size' AX.25 1200 baud TNC, plus:

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Personal Message System with all the state-of-the-art features.

APRS (Automatic Packet Reporting System) compatible **GPS** support built-in. Works with either the standard single serial port or the optional second serial port.

Terminal programs for both DOS and Windows included.

Upgradeable. EPROM and RAM are both socketed for ease in upgrading firmware and increasing memory.

Cables. RJ-45 serial cable with adapter to DE-9S. RJ-45 radio cable has real wire - solders easily to radio connectors.

Instruction manual, schematic, Quick Command listing, and power cord included.

Options

RAM. 128k, or 512k.

Battery Pack model. The case of the battery pack model fits a quick-change 6vdc slide-on/slide-off battery pack which allows continuous operation. The PicoPacket contains a built-in battery charging circuit.

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Built-in GPS receiver. The GPS model has a built-in Garmin-20 GPS receiver. Total size only 2 x 2.5 x 3 inches. External GPS antenna provided.

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The new PacComm BayMod-9600 is the lowest cost way to get on 9600 baud packet.

- The BayMod-9600 plugs into the parallel port of your PC compatible computer.
- All the packet work is done by your PC.
- Uses BayCom software version 1.60 (provided).
- Requires a 9600 baud capable radio - will NOT work with an unmodified voice radio.
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- Includes BayCom version 1.60 on 3.5 inch disk, 80+ page instruction manual, radio cable, and power supply.

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PacComm has licensed the PACTOR-II design from S.C.S., the developers and will manufacture the unit in our Tampa, Florida factory.

PacComm Packet Radio Systems, Inc.

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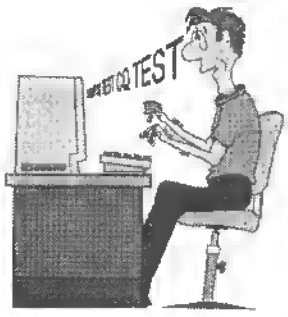
The Contest Chair

Hints, Tips & Inspiration for Better Scores

by Ron Stailey, AB5KD • 504 Dove Haven Dr • Round Rock, TX 78664
Internet: ron481@austin.relay.ucm.org



Hello Contesters and Dxers. Well the ADRS WPX had her first test run on Feb 4th/5th. I must say, I think for the first year it was great. We were short of a lot of DX in the USA. The DX was on, we just couldn't hear them most of the time. Conditions are something you can't help. You have to accept what comes your way. Sunday was a lot better for most of us. I know I had several good openings to Europe for multipliers so when I had a chance, I grabbed all I could get. Also Japan was on, in very nice quantity. Early Saturday morning was the best (on 40m) for me.. All in all for our first solo effort was a big success in my opinion. I am definitely looking forward to next year.

This month we will have Part-2 from Jay WX0B. He will talk about his station in Sunnyvale, Texas.

A Single Tower Contest Station

Part II

by Jay Terleski WX0B

In the previous installment I wrote about how I stacked and phased yagi antennas 4/4/4 elements on 10, 15 and 20 meters, as well as stacking 2/2 on 40 meters and twin vertical dipoles on 80 meters. All of this was accomplished by using the " Stack Matcher " I developed using high power UN-UN's. These are available now from Dunestar Systems, <ref. 1.> In this part I will cover what I do on 160 meters, how I bring all the feeds into the shack, grounding, station switching, filters, software and station set up.

On 160 meters I use a sloping 1/4 wave vertical wire which slopes off the tower from the 125 foot rotating ring. I feed it 35 feet above the ground with a 50 ohm torroidal core balun I built. These baluns are also available from Dunestar Systems, as well as many other vendors. I would stay away from the "current type" ferrite bead baluns that seem to have a lot of favor these days. They use high permeability beads which can heat up at these frequencies and literally cause a fire. I had one blow up on my 80 meter inverted vee last year that literally burnt the Teflon RG124 coax inside the balun body. The band went dead right in the middle of an 80 meter run. I later found the problem after cutting the balun apart. This was at the first bead point.

I usually listen to the beverages when using 80 or 160 meters. I have four of them now laid out as follows: 800 ft on EU fed with separate feed line, 900 ft two-wire beverage East/West-I'm moving it to SE/NW soon; 700 ft North. These are fed with a relay switch box to select them. I use RG59 cable for the beverages since I had a lot of it around and bring it into the shack where it is distributed between two radios. I match the 470 ohm beverage impedance with a 9:1 transformer again made from a torroidal core. I find that the signal levels are strong enough that putting a pre-amp at the feedpoint is not needed at all.

For the yagis, on the tower I pulled up 7/8 inch 50 ohm hardline inside the tower to the Stacking box. All the yagis are then fed with RG213 of equal lengths per band. I used N-type connectors on all of my cables, switch box, and shack feed-through. If for no other reason, I use them because of the better weather proofing. I also use standard weather proofing techniques on all the connections. I run all the feedlines, stack control, and rotor control lines down inside the tower and underground to the shack through 6 inch PVC sewer pipe. Then, they go through a 1/2 inch copper bulkhead plate to the relay A/B rig switching matrix which is mounted on the wall next to the plate. The A/B switch schematic is shown in fig 1. It allows rig A priority over rig B, so rig B cannot hot switch rig A. It uses Deltrol RF relays I found in the Surplus Sales of Nebraska Catalog (ref. 2). There part number is RNF-100-DP. These are excellent relays to use since they have 5000 volt spacing between contacts. This keeps rig and antenna isolation very high, which is necessary for a multi-rig environment. As you can see from the picture I have a ground plane under the relays and use heavy braid to ground it to the feed through bulkhead in the wall.

One of the teatures I wanted was to automatically ground any antenna not being used. This design accomplishes this goal as well. I control the A/B switch from two large rotary switches mounted on a panel which sits between rigs A and B. I also control the stacks from the same panel and have a rotary switch for each band. A master 12 volt supply feeds this panel where it is distributed to all the relays in this system. I have a huge 25 pair cable which goes up the tower to the stack switch box. I have been experimenting with 1/4 wave stubs teed at the bulkhead to help with inter-station interference with great success. I plan to add 1/4 wave stubs grounded at the far end outside the shack to also aid in lightning protection, as well as bleeding off electrostatic charge. The Stubs add about 20 dB of filtering isolation to inter-station harmonics and hash. From the A/B switch, the two feedlines for rig A and rig B go to the amplifiers. The amps are fed from Dunestar model 600 six band bandpass filters which go

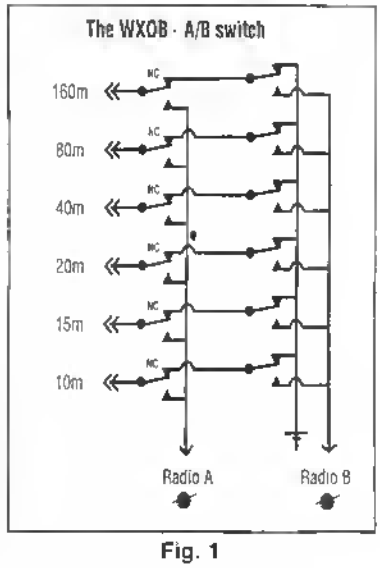


Fig. 1

to the rigs. These are selected in parallel from the A/B switch antenna selector panel. I don't automatically switch the antennas even though I could if I needed to in the future.

I feel that operators need to know what bands the other operators are on, and looking at the switches easily shows them that information. In many contests, I dedicate a rig to 20 meters. I then simply take a feedline from the 20 meter bulkhead feed through to the 20 meter station. We use a dedicated Dunestar 20 meter bandpass filter in this case. I have also used the I.C.E. bandpass filters with good success for this purpose as well. Sometimes a fourth radio is set up with similar treatment.

HOW DOES IT ALL PLAY?

Now for the acid test. What happens when you stack all these beams so close to each other? What kind of detuning occurs and how bad is the inter-station interaction when more then one rig is used. As you can imagine this is a worst-case environment to be running multi-anything. But inter-station interference to my relief wasn't very bad at all with bandpass filters. Putting in the stubs pretty much fixed the 2nd harmonic problems between the worst-case stations. We can't exactly hear on the 2nd harmonics but we can get very close to them with very little hash being heard. The bandpass filters are an absolute must. The bands are useless without them so I recommend anyone trying this to start with them first and then add stubs where necessary.

As far as detuning of antennas, yes there is some. When we tried to put the lower 20 meter beam on the tower it was heavily effected as to the resonant frequency. But we were able to bring it into resonance after a few trips up and down the trolley wire and it now behaves nicely. The tower has Phillystran (tm) for the upper two guys and I'm certain that this helps keep things manageable as well. One thing I did, and think it good advice for anyone contemplating using Phillystran, is to make the upper and lower portions of the guy out of steel guy wire. The upper one to protect you if you were to drop a sharp tool. Phillystran, although very strong, will cut easily. The lower part to protect from vandalism. I use insulators to break up the steel guys to keep resonances out of them.

GROUNDING and SAFETY

I have never seen lightning like we have here in North Texas. (He should live in the Tampa, FL area!-Ed) So I took heed from the experts when it came to grounding. Even so, we shut down during severe thunderstorms and disconnect coax, rotor cables, and AC power cords. The tower sits on a ridge about 40 feet above a large lake. So its kind of exposed! I put a 24 foot aluminum mast on top of the tower. It extends about 18 feet above the tower and there are no beams on it. I hope it acts as a lightning rod! I grounded the base of the tower with 5 eight foot ground rods ringing it about 1 foot out from the cement. I also carry the ground to the shack bulkhead which has 6 ground rods. I use this huge copper cable I bought at a local electrical outlet to tie them together see <fig 2>. The AC mains come to the house from underground and again go underground to the shack from the house. I feel like I can avoid using AC main protection because of this, but I may still add it later. So far I do not think I have taken a direct hit, but I try to be careful and disconnect when not using the station.

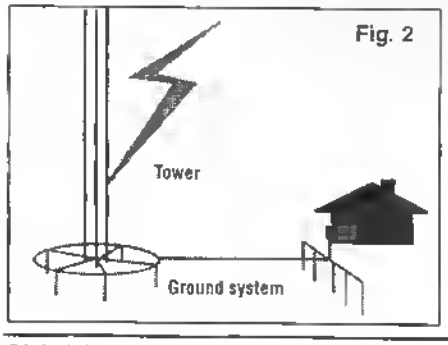


Fig. 2

Now a word about wind loading. I can foresee many readers and Rohn Tower Corporation writing me about my idiotic overloaded tower. I had my doubts as to what could be done with the tower as well. But calculating the force moments proved that it was doable. I am amazed at how well it survives 80 to 90 mph winds that it has seen already. BUT. . . I have no intentions of leaving it in this configuration! So please understand that the plan is to unload the tower with a second tower this spring. This was a neat experiment of what could be done, and it was a good R&D platform for me to develop the Stack-Match. But I believe that the antennas will perform a little better with some breathing room between them. And I will breath a little better knowing that the tower has fewer antennas on it as well....HI!

CONTEST SOFTWARE

I use Wyvern Technology RTTY by WF1B <ref. 3>. I'm certain most of you are familiar with it. It is easy to use, and will cover the new WPX contest. Ray is continually adding more features and promises to have networking of more then one computer soon, which I personally would like to see. Ron could possibly keep me out of trouble here, but I am not aware of any other digital contesting software available. (Note: There are four contest packages on the market that I know of—Aries, Comprtty II by David KC2HO, Scotchlog by Hal WA7EGA, and RTTY by WF1B-by Ray WF1B. de Ron).

CONCLUSION

The stacks play very well as it is easily demonstrated here by switching between them. One learns a lot about propagation modes when you have the ability to switch in different combinations. It has also been a very key option to be able to transmit and hear in two different directions at the same time. Not only to work DX in contests but also to let the other North American stations know we're on a frequency, or to be able to hear others using a frequency before we start CQing on top of them. Being able to control the antennas to two or more radios took some development as well, but careful use of high isolation relays and filters made this possible even when using a single tower for all those antennas. I hope this has been an informative article as to what the team at WX0B has been up to. Maybe it will even convince some to stack tri-banders and get into contesting RTTY, SSB and, CW.

I thank RON and the Digital Journal for asking me to write this. I also wish to acknowledge the many amateurs who have helped me build this dream station of mine. I won't list them all from fear of leaving someone out, but you know who you are. How can I not mention my thanks to my super XYL Sharon, who saw my towers when I lived in California and still married me and then offered encouragement while this one went up! 73 and see you in the RTTY tests. Jay Terleski WX0B wx0b&aol.com.

References: 1. Dunestar Systems, P.O. Box 37, St. Helens, OR. 97051 503-397 2918 2. Surplus Sales of Nebraska, 1502 Jones ST. Omaha, NE. 68102 402-346 4750 3. Wyvern Technology, 35 Colvintown RD, Coventry, RI 02816-8909 401-823 7889

I hope you have enjoyed Jay's articles written for us. Please let him know what you think of his articles, he will be more than happy to assist you with any other information you may need, and we just may be able to get him to do another article in the future. Next month we will visit with Arie 4X6UO and what contesting is like from Israel.

Until next time, 73's de Ron AB5KD

"Remember "Big Antennas high in the sky work better than little one close to the ground..."

Packet Power

Tips for the new and seasoned packet user

©1995 by Dave Wolf, WO5H dba Maingate Resources
P.O. Box 189, Burleson TX 76097-0189 / CompuServe ID: 73427,2246

COLOR GRAPHICS VIA PACKET

If reading the plethora of 'for sale' messages has lost its luster, there's something else you can do with your computer and packet setup that is a ton of fun. You can create and view ANSI color graphics. A couple of years back these things were hotter than a $20 pistol. It's time to revisit them and, perhaps, rekindle the interest that they generated when they first became popular. Forgive me for editorializing, but I'd rather have one imaginative ANSI graphic than a dozen 'for sale' bulletins!

What does ANSI stand for? American National Standards Institute. A clearinghouse for a variety of technical specifications. Different manufacturers and researchers can get together and agree on a set of standards so that a PL-259 from one company will fit an SO-239 from another company, for example. In the case of graphics, what the standards allow us to enjoy are the same set of colors on different computer hardware. This is a tremendous amount of oversimplification, but the focus here is on the fun we can have with ANSI graphics and not the ANSI standard!

I'm big on using technology to have fun so that you learn new things. The best part of ANSI graphics is having fun creating, collecting and observing simple artwork. As we are having fun, packet graphics will increasingly be used for more serious things. Consider a disaster scene, and ham packet helps emergency management officials with full-color digitized maps, diagrams and such. The data for these digitized images can be safely held on hard disk or CD ROM, well away from the danger area and on computers more powerful than the laptops likely to be carried out to a disaster area. By way of high-speed packet, this data can be turned into useful images, viewed on a laptop. It isn't science fiction. Preliminary work on this application of packet radio is now being done with weather radar graphics images and APRS locating.

Here's how to view ANSI graphics (thanks to N6OIY, and others, for their past work):

1. You must have an IBM-compatible computer a COLOR monitor! (exceptions: the Mac and Amiga also run ANSI graphics with special software!).

2. Set TNC: 8BITCONV ON and AWLEN 8. Check your terminal program and make sure it does not 'strip' the 8th bit.

3. If you view the file from DOS, enable ANSI by including the ANSI driver (DEVICE=ANSI.SYS) in your CONFIG.SYS file. ANSI.SYS will be placed in memory. Some terminal programs, such as ProComm, Omodem, Telex and Clink enable you to observe the graphics as you read them from your local BBS.

4. Use your ASCII download procedures to save or capture ANSI files to disk.

5. To view ANSI graphics from DOS, enter: TYPE <path> <filename>

6. ANSI sets your screen background color to black. ANSI files control the screen colors when they finish running. Typically, white on black. If you wish to have other colors, try DOS command CLS or Alt-C in later versions of ProComm Plus. You may need to reload your terminal software to get your default screen colors or look for a Ctrl or Alt command.

7. Unless specified otherwise in the owner's manual, personal mailbox functions in TNCs will strip out the 8th bit, so they 'eat' ANSI graphics. Sorry... You must manually download from another station or your BBS.

8. To create ANSI graphics, you need a program such as TheDraw, which is shareware. Check your local landline BBS or your packet BBS for TheDraw.

One nice program that I found on CompuServe in the GRAPHSUP forum is ANSPAI.ZIP. This is an off-line ANSI graphics viewer. You might find it on your local BBS.

"REPLY VIA PACKET..."

If you announced on your local FM repeater that you had a rig for sale and someone wanted to negotiate price and delivery with you, would you do so? I kinda doubt it. Why do so many people treat packet differently? Part 97.113 gives us the special privilege to announce that we have amateur radio-type items for sale, but does not authorize us to conduct negotiations on the air. There is no difference between haggling on a voice repeater, and inviting counter-offers and negotiations via a reply packet.

Sysops: you should not accept 'for sale' bulletins that do not include a phone number or at least a mailing address. Sysops at all of the TAPR (Tucson Amateur Packet Radio) BBS Special Interest Group meetings continue to express dismay at the national 'for sale' bulletin board that they are supporting with their hard-earned dollars. There is great pressure to reduce the volume of 'for sale' bulletins on the network for concern that they are displacing P-type and NTS traffic.

Users: avoid a great day of reckoning, and start exercising more responsibility when posting 'for sale' bulletins. INCLUDE a phone number. It's okay to include a PRICE. DO NOT invite people to reply via packet. If you want to reply to a 'for sale' bulletin, avoid the temptation to do so by radio.

About 'for sale' bulletin content: make sure that the geographical area that you direct a bulletin to is appropriate for the item. Try to sell it locally first. If it doesn't move within a few weeks, repost the message to FORSALE @ <your state>. Only if you can't sell a ham item within your state, and you've given it plenty of time, then consider the dreaded FORSALE @ ALLUS. I have seen the proverbial tower for sale in Maine (you pick up). I have seen kids' swing sets and motorcycles. This stuff doesn't belong on packet or ham radio. This isn't the last time I'll be writing on this subject!

ROLL YOUR OWN

After 15 years of working with personal computers (starting in the TRS-80 days), I finally decided to build a PC from the ground up. It's not honest to say 'from scratch' because there isn't any soldering! I had purchased a nice case with hefty power supply a couple years back at a sidewalk sale here in the Dallas/Ft. Worth area and wanted to 'populate it.' Fortified with lots of books, I decided to make a pilgrimage to Fry's Electronics in California. I have family in Southern California, and trips have usually included visits to the various ham emporiums over the years. Places like Henry Radio and HRO in Anaheim have been on the list. The past couple of years, as the digital bug has bitten pretty hard, a trip West wouldn't be complete without a shopping spree at Fry's. Fry's, for the uninitiated,

sells everything from ICs to Twinkies. It started in the Bay Area from a grocery store. How they got to computers and consumer electronics, I haven't the foggiest. If you haven't seen one, it is worth a visit. Imagine Radio Shack on steroids. And bring lots of cash or your credit card.

The essential components were purchased in California and stuffed into my luggage for the return trip. A few additional peripherals were picked up here in the D/FW Metroplex. On a free weekend, the parts were assembled. This is not for the faint of heart. The motherboard I bought had the scantiest of documentation. Luckily all went together with little difficulty. The only problems were some flaky memory SIMMs I bought locally, and the high-resolution drivers that came with the video card (Speed Star SE) were not friendly to Windows or OS/2. The memory problems were solved with a return trip to the dealer. New drivers have been released by the manufacturer, but I haven't installed them yet.

This new computer is going to replace the current 'user' computer on the WO5H Packet BBS. It was so much fun putting it together, that I can't wait for the chance to build up a replacement for my 'work' computer.

Was it cheaper than buying one already put together? Probably not. The learning experience was worth it. Buying was spread out over several months, so it spread the fun out. It has exactly what I want, including 6 serial ports plus a modem. A plug-n-play system never seems to have enough expansion slots for DRSI cards, network cards, extra serial ports, and such. My work computer has three expansion slots. Add a CD ROM? Forget it! I'm lucky to have a second parallel port and graphics scanner added. Enhanced IDE or SCSI peripherals? Doubtful. Next time, I'll build another computer from scratch and get exactly what I want. For those who have retired the soldering iron and are looking for something to do, consider assembling a new computer.

Don't forget that the Packet Power column is like one pole of a magnet. The other half is your mail or inquiries on topics about packet radio. If you've got a packet question or problem, send it my way:

Dave Wolf
Packet Power
P.O. Box 189
Burleson, TX 76097-0189

SCHEDULE OF EVENTS ★ DAYTON 95

THURSDAY: Radisson Inn lounge: Casual get together after 5:00 P.M. until ?
6:30 P.M.~ ADRS Board meets tor dinner and meeting (hotel).

FRIDAY: **(JADE II Room at Radisson Inn)**

8:00 A.M. ~ Warmup - Crawford McKeand, WA3ZKZ and Jim Mortensen, N2HOS
8:15 A.M. ~ ADRS General Meeting - Warren Sinsheimer, W2NRE
8:30 A.M. ~ APRS Packet radio - Gwyn Reedy, W1BEL
9:30 A.M. ~ Internet and ADRS BBS operation - Jay Townsend, WS7I and Paul Richter, W4ZB
10:20 A.M. ~ Coffee Break
10:30 A.M. - 12:00 noon

a) RagChew (a Windows program for RTTY, AMTOR, and Pactor) - Jim Jennings, KE5HE

b) Express 3.0 (a new Windows program for Clover) - Peter Schulze, TY1PS

c) SNAP (a propagation Prediction program) - Crawford McKeand, A3ZKZ

FRIDAY EVENING

7:00 to ? - DX/Contester Dinner - Radisson Inn, Crystal room, emceed by Ray Ortgiesen WF1B. After dinner a short proRram will be presented by Ron Stailey, AB5KD, Eddie Schneider, W6/GOAZT, and Ron Hall, KP2N.

7:00 to ? - Digital Journal Hospitality Suite - Radisson Inn in the Jade II room.

SATURDAY

11:15 A.M. to 12:45 P.M. Digital Digest forum - Hara Arena, room 5 - A panel of experts from industry and amateur radio will discuss "Plug and Play." Connecting radios, modems, and computers has long been a problem for the average Ham, this forum will address this issue in depth. Moderator, Dale Sinner, W6IWO.

SATURDAY EVENING

Digital Dinner - No host cocktails at 6:00 P.M. and dinner served promptly at 7:00 P.M. in the Regency room (downstairs off lobby area) ot our hotel. A short program will follow dinner, emceed by Jim Mortensen N2HOS. Our dinner speaker will be the well known Dx editioner, Vince Thomoson, K5VT, tollowed by presentations and the door prize drawing.

9:00 P.M. to ? - Hospitality Suite in the Jade II room again open.

Radisson Inn North Dayton address:
2401 Needmore Rd. where I-75 meets Needmore Rd. Tel: (513) 278-5711

LAST CALL to sign up!

Digital Journal Dinner

Dayton Hamvention
Saturday April 29, 1995
Regency Ballroom - Radisson Inn

If you plan to attend this gala affair, you must pay in advance for your dinner. Dinner and ticket information as outlined below:

Menu

Salad Bar
Swiss Steak
Chicken Supreme
Red-skin potatoes
Green beans almondine
Bread, butter
Beverage
Dessert Table

No-host bar 6:00 to 7:00 P.M.
Dinner served at 7:00 P.M.

Ticket Info

Betsy Townsend, WV7Y
P.O. Box 644
Spokane, WA 99210
(509) 534-4822

Make checks payable for $23.00 per dinner to Betsy Townsend. Sorry no credit cards can be accepted.

Each year this dinner has gained popularity. You won't want to miss this event. *Order your tickets today!* After dinner we will enjoy a short program. Your MC this year - Jim Mortensen, N2HOS

DX News

The latest digi-doings from around the globe

by Jules Freundlich, W2JGR • 825 Summit Ave., Apt. 1401 • Minneapolis, MN 55403

Propagation blues got you down? String up those wires and get into the swing of things on the lower HF bands.

As the current sunspot cycle dozes its way towards a minimum, there is no reason to lament the lack of DX. There are plenty of DX stations propagating on the "lower" bands. A recent sampling of spots on our local packetcluster network here in the mid-west U.S.A., clearly shows that starting during the late local afternoon hours, and continuing well into the following morning, the old fashioned modes are still enjoying a feast of DX delights. The following prefixes showed up, on CW or SSB, within the time period noted. If these modes are propagating, you can be sure that RTTY signals would also be supported.

30 meters: (24 hours) VY1, ZK1, J7, VI0, FK, GU, EA8, GM, S5, HA, A7, YQ, CT, UA0, and DK.

40 meters: (24 hours) VP5, ZK1, JA, PZ, VK, PJ9, EX, V6, VQ9, S0, JW, EA8, LZ, HA, ZA, IS0, T9, CU, Z3, UA6, FG, 5R, HL, DU, VP2M, CX, YS, 9Y, and YZ.

80 meters: (24 hours) G, JW, HL, VK, TI, JH, HA, UR, Z3, EU, 9K, TU, QM, OY, LX, I, GM, J7, GW, EI, PJ9, PT, CU, KL7, VK9/n, EA, S5, CT, P4, FM, YV, and ZS.

160 meters: (2 days) EA8, OM, G, EI, EA, F, 9A, J7, C6, VP2E, SV, DJ, UT, JH, 9J, KL7, ZS, SM, CN, XE, and A2.

During the time of the above observatons the Solar Flux Index (SFI), as reported by WWV, varied between 85 and 91, A-index was 2 or 3, and the K-Index varied from 0 to 2.

Run your own survey. If you are not fortunate enough to be within reach of a DX spotting network, concentrate as Rich, N6GG, has suggested, on listening for DX CW signals at the low end of the bands. Their presence is a good indicator of band conditions.

Tune slowly and use headphones. I am sure you have observed that both 40 and 80 meters carry RTTY activity during contests. That's fine, but let's cultivate these lower frequencies as bands for RTTY DXing, not just for contesting. When 20 meters and above go dead, downshift to "low band" gear. There's a whole new DX world out there. If the band seems quiet, don't be bashful about banging out a dozen or so sets of CQ's.

It is always interesting to see a new rare RTTY DX station appear on the bands run by an operator with little or no experience in handling (should I say fighting?) the initial pileup. We recently observed two stations going through almost identical learning curves within a week of each other. In mid-February both TN4U and DP1KGI burst upon the scene operating transceive. As you might expect, resulting QSO rates were pathetic. After about an hour or so, each operator realized that the better way to do things was to go split. Without fail the chaos was replaced by a semblance of order, and station after station was able to get through if there was half way decent propagation to the area. One thing that many DX operators still have not learned, is that it is important when working a pileup, to send your call-sign both at the beginning and at the end of his response to you. All too often, the initial reply is masked by QRM. When the listening horde copies "...%*##$%& UR 599 ON SKUNK IS. OSL? DE BL1P", the question in many minds is "who did he come back to?" This problem is minimized, but no eliminated, during a split operation.

Again, it must be emphasized...LISTEN BEFORE TRANSMITTING. We had a frenzied crowd, from all over, vying for DP1KGI, when a 74 baud signal came on right on top of him, literally obliterating his signal. It turned out to be a W4 station establishing his daily schedule with a South American station. Surely, the W4 must have been copying the DP1, as other W4's were calling South Shetlands. Someone jumped in at 74 baud to explain ORL DX HERE PSE OSY. They acknowledged the interruption, but continued to discuss the situation before QSYing and clearing the frequency. A little more consideration was certainly in order.

Several days after the TN4 and DP1 came on the scene, "Crazy Peter", ON6TT, of 3Y0PI fame, who is an experienced RTTY operator, gave the RTTY gang a thrill by coming on as 9Q5TT from Goma, near the Rwanda border. Peter is engaged there in humanitarian relief activities. He displayed a remarkable facility in handling the pileup on his frequency. The progression of stations was so orderly, it appeared that they were all standing in a line awaiting their rightful turn. Wipe-outs by constantly calling stations, poor tailending, and other well known malpractices were at a minimum. However, Peter, at the beginning of his RTTY operation, did not repeat the callsign of the worked station at the end of his transmissions. It took him about 3-4 days to finally adopt that practice. Fortunately the demand for 9Q was somewhat less than for DP1 and TN4, but after a few days, he did operate split. It sure is a pleasure to see a real "RTTY-Pro" at work. If you worked Peter, QSL to ON5NT. By the way, Peter has had his eye on a possible operation from 9U, Burundi. He told John, N0FAC, that it is very difficult to arrange, but that he will try.

Stay tuned.

WHAT COMES NEXT?

"If you can look into the seeds of time,
And say which grain will grow and which will not, Speak then to me....."
Banquo in Shakespeare's Macbeth, Act I, iii

What is the future of RTTY DXing? DXing is as old as radio itself. RTTY DXing quickly came of age as soon as RTTY was permitted on the HF bands in the early 50's. It has persisted, fueled by the marvellous technical developments of the century. Digital technology continues to advance at break-neck speed. For just one aspect of it, go back and reread the article in the DJ for February 1995, p. 10, on TCP/IP Wormholes, by Joe Kasser, W3/G3ZCZ. The boundaries between HF DXing and VHF DXing are becoming hazy. To add to the pudding, we now have the Internet, a wired/wireless system with protocols providing E-mail and conferencing capability using software packages common to amateur radio.

In some sense, the more things change, the more they stay the same. The adoption of the computer, and word processing, was supposed to lead us to a paperless society. Tell that to the paper and printer manufacturers! It is true that the advent of SSB obsoleted AM, but the store and high speed forwarding niceties of advanced digital systems will never substitute for the social aspects of real time person to person contact. The human psyche cannot be confined for long in a mailbox. Furthermore the explosion of information availability can be absorbed only at the rate that the human mind allows.

My simple minded conclusion, therefore, is that we will continue, for some time, to enjoy the personal interaction that RTTY DXing affords. The mechanics of accomplishing it might change, such as marrying HF to VHF technology. But that will simply be, perhaps, a better way of doing the same thing. (As long as the human body retains its essential structure, I would not expect real time voice communication ever to be obsoleted.) In the meantime, we will continue to use the tried and true methods, until one which is demonstrably superior comes along. We will often be surprised and pleased by the appearance of new technological applications. Those that suit our needs will be embraced. Others will be ignored or discarded.

Happy DXing! RTTY Forever!

DX DOINGS

(Signals are 45.5 Baud RTTY unless noted.)

Note that the DX Doings below include activity as reported from world-wide sources. Therefore, some stations may not be seen, in your particular part of the world, at the hours indicated. To make best use of the data given, couple it with your knowledge of propagation paths to your QTH. For help in this regard, see the monthly propagation charts in QST, and listen to the hourly propagation forecasts at 18 minutes past each hour on WWV. Good luck!

ALBANIA, ZA - Mike, ZA1MH, a missionary with home call of K5KWG from the Dallas area, keeps this once rare country highly visible on RTTY. Best time to find him is about 2000Z on 20 meters. QSL to Mike Holman, P.O. Box 19, Tirana.

ASIATIC RUSSIA, UA9,0 - Looking for Zone 19? Try for UA0FZ on 20 meters around 2400Z. QSL to W3HNK. UA9FJ is also active on 20 meters around 1315Z. QSL via CBA.

Looking for UA0Y..Zone 23? A DXpedition to Kyzyl, the capital city of the Tuvan Republic in Russia will take place in late May, or early June of 1995, and is expected to last about four weeks. At the invitation of FAIRS (Foundation for Amateur International Radio Service) member, Dr. Yuri Katutin, UA4LCQ, Pat, AA6EG, is organizing an American team of operators for this trip. The American operators will journey from Washington D.C. to Moscow. There, they will be joined by the Russian contingent of five amateurs including UA5WE, RB5WA, UA4LC, and others. They will then all embark on a one week train trip to Abakan, Siberia. The final one day leg of the trip to this geographical center of Asia will be by local motor vehicle. AA6EG reports that all DXpedition radio equipment is in Moscow for 80-10 meter operation. However, John, N0ISL, who is expected to be the RTTY operator is looking for a good transceiver, costing no more than $600. that he can leave at the club station when they leave. As of the end of February, there was room for another operator. If you are interested in participating in this expedition, contact Pat Barthelow, AA6EG, 1388 Boles Ct., Seaside, CA 93955. Telephone:408 394 5531 Internet:4947@mgs.com, or Packet:AA6EG@k6ly.#nocal.ca.usa.noam.

Tuva can be considered a place that history almost forgot. For further reading on this fascinating locale, see DX News, RTTY Journal, October 1993, p 7, "Help for Tuva", QST, March 1995, p 22, "A Journey to the Center of Asia", and "Tuva or Bust: Richard Feynman's Last Journey" (W.W. Norton 1991).

BALERARIC IS., EA6 - EA6CP and EA6MQ can be found between 1330 and 1630Z on 20 meters. QSL each to their CBA.

BELARUS, EW - EW8AU frequents 20 meters around 1330Z. QSL route is needed.

CAPE VERDE, D4 - In the January 1995 issue, we reported that D4CAG was a station from Cape Verde. Shun, JF1MGI advised me that this is a maritime mobile station operating on the high seas, but not signing /MM. Shun understands that calls like D4CAE and D4CAG (D4 + three suffix letters) are probably issued for professional radio stations. When they are asked for a QSL route, they don't respond to the request. It is not known if they are authorized to operate on the amateur frequencies.

CENTRAL AFRICA, TL - TL8MS now operates on 20 meters as early as 0630Z and as late as 1330Z. QSL via DL6NW.

CHAGOS IS., VQ9 - VQ9SF can be found on Pactor on 14069 khz around 1840Z. QSL route is needed.

CONWAY REEF, 3D2 - The multinational team of SM7PKK, QH1RY, SM6CAS, and NI6T should be active until 3 April, including the CQWW WPX contest. RTTY frequencies are 7030, 7082, 10120, 14082, 18100, 21082, and 28082 khz. As we went to press, the callsign had not yet been announced. QSL for RTTY to SM7PKK.

DODECANESE, SV5 - SV5AZK and SV5BYP are both active on 20 meters between 1130 and 400Z. QSL routes are needed.

EGYPT, SU - Reda, SU1CR now operates Pactor on 14069 khz as late as 1900Z. For QSL route see DJ, March 1995.

FALKLAND IS, VP8 - RTTY has many consistant adherants in this South Atlantic group. VP8WA, VP8CIL, VP8CKN, VP8CQJ, and VP8CQH all appear quite regularly on 20 meters mostly after 2130Z. As mentioned in a previous column, VP8CIL likes to move to Pactor, once a contact is made on RTTY. QSL VP8CIL via G0EHR. For QSL route of VP8CKN, see DJ, February 1995, p.23. For QSL route of VP8CQH, see DJ, January 1995, p. 19. For QSL route of VP9CQJ, see DJ, December 1994, p. 18. A current QSL route for VP8WA is needed.

FIJI IS., 3D - 3D2XC works 15 meters around 0430Z. QSL route is needed.

GREECE, SV - SV1AMH and SV1BSX can usually be found on 20 meters between 1315 and 1400Z. QSL SV1AMH via the CBA. QSL route for SV1BSX is needed.

HEARD I., - VK0 - We have it on good authority that there will be an expedition to this much wanted country, sometime in the not too distant future, led by Tony, WA4JQS, of VP8SSI and 3Y0PI fame. To keep up to date with the latest information follow the weekly VK2SG RTTY DX Notes.

JAN MAYEN, JX - JX7DFA works 15 meters around 1330Z. QSL to Per-Einar Dahlen, 8099 Jan Mayen, Norway.

KALININGRAD, UA2 - UA2AD works 20 meters around 1530Z. QSL route is needed.

LATVIA, YL - Look for YL2KF on 20 meters around 1000Z. QSL route is needed.

LORD HOWE I., VK9L - Eddie, W6/G0AZT, and Glenn, W6QTC will undertake a trip to Lord Howe sometime in September. Details are expected to be announced soon.

MACAO, XX9 - If you haven't been able to work XX9AS on 20 meters around 1445Z, try looking for him about two hours later than that. QSL to KU9C.

MALI, TZ - TZ6FIC has been reported on 20 meters around 1845Z.
QSL to FF6KEQ/F6KEQ.

MAURITANIA, 5T - 5T5JC operates 15 meters around 1330Z, and will generally be on 20 meters after 1900Z. QSL to F6FNU.

NORTHERN ISLAND, GI - GI4WXA can be found on 20 meters between 1330 and 1630Z. QSL via CBA.

PERU, OA - OA4CZQ is active on 20 meters around 2230Z. QSL to P.O. Box 538, Lima, Peru.

SOUTH SHETLAND IS., VP8, DP1 - By the time you read this, Tom, DP1KGI will have gone QRT, as his assignment on Ardley Island was completed. The RTTY gear shipped by IRDXA, for the Polish Base operator, Andy, SP2GQW, who has been operating other modes as VP8CQS, has been sitting at the freight depot at Puenta Arenas, Chile, awaiting pickup by base personnel. It was to have been picked up by Andy when he was in transit to Arctowski base. IRDXA has received no indication that such a pickup is now imminent. It is likely that the HAL Telereader will be returned to the U.S.A. soon. This country is still high on the wanted list, despite the many QSOs given out by DP1KGI. QSL DP1KGI (with appropriate enclosure) to DD6UAB, Thomas Schoentag, Kienofenpromenade 3, D-17279 Lychen, Germany.

SPRATLY IS., 9M0, 1S - 9M0A and 9M0AG are scheduled to be active between 29 March and 3 April on CW, SSB, RTTY and SSTV. Operators will be JA9AA, JA9AG, JR9GBJ, JS1QHQ, 9M6BZ, 9M6JC AND 9M6SI. RTTY frequencies are 7029, 14080, 21080, and 28080 khz. The Philippine Amateur Radio Association will conduct an expedition to the Spratlys under the leadership of its President, Bobby Garcia, DU6BG, from 10-16 April. All bands and modes have been promised. We assume that RTTY is included, but have no confirmation. Callsign will be DU0K. QSL via DU9RG

SUDAN, ST - If you can't be around to work Lou, ST2AA on Pactor in the early UTC day, try looking for him on 14069 khz around 1430Z. QSL to WB2RAJ.

TURKEY, TA - Look for TA2FM on 20 meters as early as 0730Z. QSL route is needed.

WALES, GW - This country is mostly represented by GW4WWE, who is likely to be be found around 1530Z on 20 meters. QSL via CBA.

VK2SG RTTY DX NOTES ON INTERNET

A reminder: The weekly VK2SG RTTY DX Notes, the only on-the-air bulletin devoted exclusively to the dissemination of digital DX news is available via Telnet or FTP at ab6z.ampr.org. The directory is called \rttynote.

HAVE DX NEWS?

Leave an Amtor message at W5KSI.#NOLA.LA.NA.USA mbx (1), or via any of the following:
Packet: W2JGR @ WB0GDB.#STP.MN.USA.NA
Amtor: WJGR on 14070 khz.
Internet: w2jgr@millcomm.com
Telephone: (612) 377 7269
FAX: (612) 374 8161 (mark for my attention) USPS to my CBA.

THANKS - Thanks to the following for all your information: AA6EG, I5FLN, JF1MGI, N5UXT, N0FAC, N0ISL, W5KSI, W6PQS, WB2CJL, W6/G0AZT, ZA1MH, and ZS5S.

See you all next month. For now, bye bye from Minnesota,PAX....

73 de Jules W2JGR

1. W5KSI scans 7069, 7071, 7075.5, 7076, 14068, 14070, 14073.5, 14074, 14079, 21074, 21075, and 21079 khz.

Contesting

Coming Events and Awards

by Rich Lawton, N6GG • 14395 Bevers Way • Pioneer, CA 95666

RTTY Contests - Coming Events

Date:	Contest:	
APR 1-2	'95 EA WW RTTY	(Spanish)
APR 15-16	SARTG WW AMTOR	(Swedish)
APR 29-30	SP DX RTTY	(Polish)
MAY 13-14	VOLTA RTTY DX	(Italian)

— — REMINDERS: — —

DARC CORONA 10M Digital

(March '95) log entry deadline is May 5, 1995. Mail entry to:

WERNER LUDWIG, DF5BX
P.O. BOX 12 70
D-49110 Georgsmarienthutte
GERMANY

BARTG SPRING RTTY

(March '95) log entry deadline is May 31, 1995 Mail entry to:

JOHN BARBER, G4SKA
PO BOX 8
TIVERTON, DEVON, EX16 5YU
ENGLAND

— — COMING UP: — —

— EA WW RTTY Contest —

April 1-2, 1995

Sponsored by Seccion Territorial Comarcal De Aranda De Duero.

NOTE: Contest now occurs on the first full weekend in April. (Previously was in February)

CONTEST PERIOD:
From 1600Z Saturday to 1600Z Sunday. (24 hours)

BANDS:
80, 40, 20, 15, and 10M (five bands)

CLASSES: A) Single op, all band
B) Single op, single band
C) Multi-op, all band
D) SWL.

EXCHANGE: EA stations send RST + Prefix of province. All others: sent RST + CQ Zone

MULTIPLIERS: Each DXCC Country and Spanish Province on each band. Spanish Provinces are: A, AB, AL, AV, B, BA, Bt, BU, C, CA, CC, CE, CO, CR, CS, CU, GC, GE, GR, GU, H, HU, J, L, LE, LO, LU, M, MA, ML, MU, NA, O, OR, P, PM, PO, S, SA, SE, SG, SO, SS, T, TE, TF, TO, V, VA, VI, Z, ZA. (There are 52 EA provinces)

NOTES:

1) All multipliers count once per band (Band Multipliers).
2) First QSO with EA station on each band counts as an additional multiplier, along with province.
3) CQ Zones do NOT count as multipliers.
4) QSOs with stations in your own country are valid for multiplier credit but have ZERO QSO point value.

QSO POINTS: On 20, 15, and 10M: Count 1 point for each QSO on your own continent, and 2 points for for the rest. On 80 and 40M: Count 3 points for each QSO on your own continent, and 6 points for the rest.

FINAL SCORE: Total QSO points x total multipliers.

AWARDS: Plate to winner in each class. Certificate to winner in each DXCC country in each class. (Must have 50 or more QSOs.)

LOGS: Use separate logsheets for each band. Include a Summary sheet to show scoring and other essential information.

QEAQLINE: Mailing deadline is June 9, 1995. Mail entry to:

EA RTTY Contest Manager
Antonio Alcolado, EA1MV
P.O.Box 240
09400 Aranda de Duero (Burgos)
SPAIN

COMMENTS: This is a 24 hour contest. Note the date change. It used to be on the 2nd full weekend of February, but now is 1st full weekend in April. The exchange includes sending your CQ Zone, but there is no additional multiplier credit given, even for EA stations. Point bonuses encourage low band operation. This contest uses band multipliers - work the same country on different band gives new multiplier. ***QSOs with stations in your own country are valid for multiplier credit but have ZERO QSO point value.*** Use separate dupesheets and multiplier sheets for each band. **Handy tip:** make an alphabetical checkoff list of EA Provinces for each band, as they do get confusing when changing bands.

— SARTG WW Amtor Contest —

April 15-16, 1995

Sponsored by the Scandinavian Amateur Radio Teleprinter Group.

CONTEST PERIOD: Third full weekend in April.
Three separate 8 hour operating periods:
0000-0800z SAT., 1600-2400z Sat., and 0800-1600Z Sunday.

MODES: Amtor ONLY. Use FEC (mode B) only for calling Use ARQ (mode A) for contest exchange

BANDS: 80, 40, 20, 15, and 10M

CLASSES: A: Single op, all band;
B: Single op, single band;
C: Multi op, single transmitter, all band;
D: SWL, all band.

EXCHANGE: Send RST + Name + QSO number (starting with 001).

Note: Exchanging of contest messages in FEC or in any way other than ARQ is subject to disqualification.

MULTIPLIERS: Each DXCC country counts as one multiplier on each band, including the first QSO with Australia, Canada, Japan, and USA. Each call district in Australia, Canada, Japan, and USA will also count as one additional multiplier on each band.

QSO POINTS: QSO with own country; five points. QSO with other stations in own continent; ten points. QSO with other continents; fifteen points.

SCORING: Sum of QSO points x sum of multipliers = TOTAL SCORE.

AWARDS: To the top stations in each class, country and district, if the number of QSO's is reasonable.

LOGS: Use separate logsheets for each band. Logs must show: BAND, DATE and TIME (UTC), CALLSIGN, MESSAGE Sent and Received, MULTIPLIERS and QSO POINTS.
Summary sheet must show full scoring, class, YOUR CALL, NAME, and ADDRESS, and a signed declaration that all contest rules and regulations for your own license have been observed. For multi-op stations, all calls or names of all operators should be listed. Logs must be received by June 10, 1995.
Mail logs to:

SARTG Contest Manager
Bo Ohlsson, SM4CMG
Skutsta 1258
S-710 41 Fellingsbro
SWEDEN

COMMENTS: This is a strictly Amtor contest. Note that there are three operating periods, each eight hours long. In between are two eight hour rest periods. Pileups must all be in FEC mode. After contact is established, each station must switch over to ARQ (mode A) for the exchange.

— SP DX RTTY CONTEST —

April 29-30, 1995
(4th full weekend in April)
Sponsored by: Polski Zwiazek Krotkofalowcow (PZK).
It is organized and run by Polish Radiovideography Club(PKRVG).

CONTEST PERIOD:
From 0000Z Sat. to 2400Z Sun. (48 hours)
Single ops allowed only 36 hours operation. No restrictions on length of rest periods.

MDDE: RTTY only

BANDS: 80, 40, 20, 15, and 10M

CATEGORIES:
A. Single Operator, All Band
B. Multi-Operator, All Band
C. SWL
D. SP stations

MESSAGE EXCHANGE: Send: RST + QSO number, starting with 001. SP stations send: RST + Province (2 letters)
NOTE: Polish stations will use a two letter abbreviation of their province. There are 48 SP provinces.

MULTIPLIERS: Count each DXCC country, including 1st QSQ with your own country. Also, 1st SP station, and each SP province on each band. (Band Multipliers) Also, each continent (6) will count once, not once per band.
BONUS: "Special SP stations with suffix *RVG* will be "Joker" in multiplier (new country or continent.") To me this means if you QSO an SP station whose suffix is **RVG**, count it as new multiplier.

OSO POINTS:
- Count 2 points for QSO with own country.
- Count 5 points for QSO with other countries on your continent.
- Count 10 points for QSQ with countries not on your continent.

FINAL SCORE: Total QSQ points x total mults x number of continents (max 6). SWL rules apply as above.

LOGS: Use separate log sheets for each band. Logs must show: BAND, DATE and TIME in UTC, CALLSIGN, MESSAGE sent and received, country multiplier and points claimed. Entries with more than 100 QSOs must submit duplicate check sheets. Multiple operator stations should include names and callsigns of all operators. We invite you to submit logs on computer disk. The format we prefer is CT.BIN file (K1EA), or RTTY by WF1B.

AWARDS: First place plaque to top winner in all classes, 1st thru 3rd place winners will receive certificates in each class and in each continent. NOTE: Awards will be issued based on participation of 20 or more entries in each class.

OISOUALIFICATION: Violation of the rules of the contest or taking credit for incorrect QSQs or multipliers, or duplicate contacts in excess of 3% of the total made, will be deemed sufficient cause for disqualification. The decision of the SP DX RTTY Contest Committee are final and not contestable.

OEAOLINE: Logs must be received by 15 June 1995 to qualify. An extension may be granted if requested.
Mail logs to:

SP DX RTTY Contest Manager
Christopher Ulatowski, SP2UUU
P.O. BOX 253
81-963 GDYNIA 1
POLAND

COMMENTS: Sounds like a fun contest but this year it occurs on the Dayton Hamvention weekend. There are major changes from last year:
- Exchange no longer uses CQ zones. Instead use QSO number, starting with 001.
- Contest period now 48 hours instead of 36. No limit on rest period length.
- Count a BONUS multiplier when QSO with SP station whose suffix is "RVG."

NOTE: Everyone, mainly W/VE stations: don't forget to count 1 multiplier for your first domestic QSO *on each band.* Note the 10 points for off-your-continent QSOs. That means you have to work 5 locals to equal 1 DX station.

-+- *SINGLE-BAND CONTESTING ANYONE?* -+-

We now have 13 major RTTY/Digital contests each year. Seven have no single-band class entry. The six that do are: ADRS WPX (FEB); BARTG RTTY (MAR); EA WW RTTY (APR); VOLTA RTTY (MAY); SARTG WW RTTY (AUG); and CO WW (SEP). Many prefer single-band contesting, especially on 20M, even during our present sunspot low. But what about the other bands?

As sunspots diminish, the MUF (Max. Usable Freq.) drops. 10 and 15M become basket cases, completely unreliable and marginal. The low activity causes piles of unanswered CQs. During these doldrums the MUF drops to between 5 to 10MHz at night, meaning 40 and 80M. Daytime 40M QSOs distance limit is usually less than 1000 miles. QRN (lightning crashes) is the curse of the low bands, particularly at night when the crashes are propagated by various layers of the atmosphere. But 40M can produce some amazing DX, especially when static levels are low, and the K and A absorption levels are low, too. This is great signal-to-noise ratio stuff, along with the challenges of very weak signal DXing. At night on 80M you're usually stuck with 2000 mile QSO distances, except when the QRN and A/K absorptions are low.

From the above, the obvious choice for single-band contesters would be 20M. If you have a reasonably competitive antenna for 40M, the second choice should be 40M. Right? NOT! I didn't mention the crucial element; ***RTTY is NOT welcome on 40M. There's no universally approved space allotted for RTTY.*** I found conclusive evidence while operating RTTY single-band on 40M during the ADRS WW WPX contest.

With my 20M beam stuck on Japan, I decided to go 40M single band in the ADRS WW WPX contest. With 500 watts and two 40M quad loops at right angles, I'd just enjoy 2 all-nighters. Sure... It became 2 nights of frustration and lutility.

Most of you know the bewildering situations when operating RTTY on 20M. With no band plan, it's always confusing, especially for RTTY newcomers. If you call "CQ CONTEST" below 14080 you're apt to get chirp/burp (Amtor/Pactor) answers, even if you send "QRL?" before starting. Above 14090 you're apt to get a Packet buzz, likely an unattended Packet BBS. Between 080 and 090 is sometimes a bizarre potpourri mix of the above. Well, 20M is heaven compared to 40M!

Disarray on 40M is world-wide. CW, SSB, RTTY, chirpers/burpers, and buzzers are scattered all over - from 7025 to 7100. Sending an RTTY "QRL?" in a "hole" between 7080-090 often brought *SSB insults* in either english or spanish, between the chirps and burps. Above 7090 my "QRL?" was often answered by Packet buzzers. I was also hearing *s-l-o-w CW, quoting the Bible* (code practice). Below 7080 was the usual chirper/burper gang, with the english/spanish, AND *oriental SSB, along with QRP CW.* Below 7040 an *FOC CW Contest* was going on. Among the FQCers there was a nice Japanese RTTY pileup on ZK3MM in Tokelau. He was on 7027, listening up. I got him after a few tries. Then I sent "QRL?" at 7033 followed by a "CQ CONTEST" trying to attract some Japanese contesters. Guess what! I got *surly CW insults, like: "LID," "QSY JERK,"* from FOCers. Found the best way to QSO DX and JAs; search and pounce, in between the CW FOC guys. Managed to work VK6, HL, VS6 and a handful of JAs. But I felt guilty and discouraged. I was interferring with the CW FOC Contest, whose CW frequency was rightly theirs. What to do? ***Why doesn't RTTY, the most popular digital mode in the world, have a space in which to flourish?*** RTTY is growing, and should be encouraged, not clobbered. No world-wide RTTY plan exists. We've got to have band plans -NOW- for ALL modes, and ALL bands. ARRL, IARU, and ADRS must support it, or RTTY contesting and DXing will soon become extinct.

My advice: STAY ON 20M RTTY! As 20M RTTY activity grows, the chaos will become more apparent. Since ADRS fiercely opposes ANY band plan, then ARRL with IARU will have to rectify it. QSY to 40M some night and take a peak. **ORV MESS?**

((73)) See you in the pileups...

Rich, N6GG

Interview with an AMTOR/APLink Pioneer

Donald Speltz, KB1PJ conducted in Nashville, TN - Feb. 6, 1995

Conducted by Wayne Renardson, NZ4W • 1113 Woodvale Dr. • Nashville, TN 37204

Internet: renardwc@ctrvax.vanderbilt.edu • Packet: NZ4W@K4CJX.MIDTN.TN.USA.NA

David Speltz, KB1PJ, is a man on a journey. Beginning when he started his amateur radio life as a high-school student, he later operated digital modes from Africa. Returning to the United States, he took part in the evolving world of digital communications by being one of the first people to use AMTOR and APLink software to establish a world-wide network for digital traffic handling. His recent travels brought him to Nashville, TN where he provided the readers of the Digital Journal with an interview about his experiences and his role in the seminal events of the previous decade.

DJ: How did you become involved in amateur radio?

DS: When I was a freshman in high school, a classmate, John Shew N4QQ, encouraged me to take novice classes from our biology teacher. We built our own equipment in the classroom. I was fourteen years old when I went to John's house to use the Heath equipment he had built. It was 1963. I called CQ on CW and my first contact was with a fellow in New York. Typical of many amateurs, I went into total paralysis. I'll never forget it.

DJ: Has amateur radio helped your career?

DS: Amateur radio did not directly benefit my career but it certainly made it more interesting. I took advantage of my amateur status during various overseas assignments. In 1982 I was CEO of a hospital in Vermont when I was recruited by the Aga Khan to turn around a financially troubled facility in Nairobi, Kenya. With my children, age one and five, I arrived there with a Drake TR-7 and a QRP rig that was later upgraded to a more powerful station.

Still unlicensed after thirty days in Kenya, I received a phone call. A British-sounding voice said to me, "Do you have communications?" "Who are you," I asked. "United Press International, South Africa," he replied. I admitted owning a radio but asked for an explanation. He exclaimed, "You don't know? We're in the middle of a revolution. The Air Force is bombing the city and I have to get a message out." I was not licensed and unable to transmit. He persisted, but I really couldn't help this reporter. I turned on my two-meter rig and listened for the local repeaters but they were silent. The operators were all ex-patriates who realized when a revolution was in progress you simply turned off your rig. If you were smart, you hid it and laid low. A few days later communications started getting out. That was my first experience with amateur radio in Kenya.

DJ: Did you finally become licensed?

DS: About a month later I passed the Kenyan exam. There was no reciprocal licensing so I had to go through the Post & Telecommunications Bureau of the Kenyan government. The most difficult part of the Morse code examination was not receiving—it was sending. They wanted CW sent only a certain way, with a Kenyan accent. They made sure I passed, but I had to do it over and over, using a straight key until I got it correct. I was first licensed when I was fifteen but at thirty-five I had forgotten how to use a straight key. After adapting to their CW style, I received station license 5Z4DD. I spent two years in Kenya operating a lot of QRP and it was absolutely wonderful being on the opposite end of the pileups. I operated all modes, including voice and RTTY.

DJ: How did you happen to become involved with RTTY?

DS: I was talking on SSB with an amateur who was on the coordinating committee for the Dayton hamfest. I had never attended so he invited me to speak at the convention. I arranged a business trip to the US and flew into Dayton. I spent the weekend with his family and presented a program on amateur radio in Africa.

I also visited the HAL booth, where I purchased a TeleReader. It was ideal for international travel and turned out to be one of the greatest purchases I ever made. I returned to Kenya with equipment and donations made by Dayton amateurs for African friends who were studying to become licensed. When I left Kenya in late 1984, I gave my TeleReader and my 515 to a group of Kenyan amateurs, which I assume serves the Kenyan's well.

DJ: How did you become involved with the digital modes?

DS: I became fascinated by RTTY and digital communications in Kenya. RTTY is a beautiful mode and a thoughtful process. As the communication comes across the screen you read it, you think it through, and then respond. RTTY allows you time to do that. You lack that opportunity with voice. To some extent you have it on CW, but with voice there's a human need to fill a void, to kill a silence. And even if you have nothing to say, you say something anyway. But with RTTY, it's as though you're sitting in a library with the information coming through to you and you can think about what you want to say. Perhaps it's a more articulate mode, a more comfortable mode.

DJ: Did you continue your digital operating after returning to the United States?

DS: Yes. I was hired by University Hospital of Cleveland and became involved in disaster planning. By 1987 I was consulting in Indonesia when I made a side trip to Tokyo. I had a friend there who was considering communications systems that might be helpful if a major earthquake hit the city. He was part of a group in Japan that assumed they would have about a million casualties after an earthquake and vital communications would disappear.

We began looking at the potential of automated HF packet to maintain communications between Tokyo and the United States. So I bought another HAL product, a dedicated HF Packet controller, but it would not handle long-range communications. I became acquainted with two other fellows in Britain, John Veale, G4SCA, and Peter Martinez, G3PLZ, the engineer who invented AMTOR. John asked why I was wasting my time on Packet, suggesting I try AMTOR. I used my KAM to link with John and lo and behold, we had a rapid, error-free AMTOR chat over a distance of 800 miles. It was as exciting as my first CW contact, thought this time I didn't freeze up.

DJ: How did you become involved with APLink?

DS: Still concerned about the issue of disaster communications, I called the ARRL and told them I was looking for assistance with the Tokyo project. Paul Newland, AB7I, directed me to Vic Poor, W5SMM, who gave me version 1.0 of his APLink software. I put it on the air using a Kenwood TS-430 where I told John, G4SCA, about APLink. He obtained the software and it worked.

DJ: How did you finally come to use APLink with AMTOR?

DS: I was in Houston when the 1988 Armenian earthquake hit. I thought, what can John and I do to help, using what we had put together. I flew back to Cleveland, contacted John, and he said, "Fine. If there's any traffic out of the States you send it to me and I'll pass it over to our disaster organization who will get it into Armenia."

DJ: How was it all organized and accomplished?

DS: Cleveland has one of the most dedicated, organized group of hams I've ever come across. They are absolutely devoted to the hobby and to community service. I put out a call saying,"I think we have a role to play in Armenia." Dozens of amateurs, clubs, and volunteers came together to make Cleveland the middleman between the United States and Armenia. We took traffic by telephone, packet radio, HF, land line BBSs, any way at all, for messages to transfer to Armenia. We received donations from AEA, Kantronics, a loan of a Yeasu FT 1000, and we had thousands of dollars worth of equipment coming into the city. Cleveland became the central clearinghouse in a large part of the United States for Armenian health and welfare traffic.

The VA hospital offered us their communications room where we assembled a twenty-four-hour a day communications center that delivered traffic out of the United States into Great Britain. John, G4SCA, coordinated and moved it into Armenia. Unfortunately, Great Britain couldn't send digital information directly into Armenia, so it was carried by voice and CW.

But it was transmitted out of the United States by AMTOR, and it is this event that makes the December 1988 Armenian earthquake a watershed for digitally based amateur radio.

DJ: How did digital communications make the difference?

DS: We had traffic with names and addresses that to most Americans were difficult to spell and unpronounceable. But it was sent correctly using AMTOR between Cleveland and Britain, significantly reducing human error in transcription and spelling.

Television stations arrived with their cameras and photographed the operation. We would basically batch the traffic. Their cameras showed the traffic being sent as it moved across the monitor. It would fly by a mile-a-minute, error-corrected, and it would dump into England. Our AMTOR link basically proved that the use of digital communications was infinitely superior to any other mode for not only speed, but basically for effective communications.

DJ: Did you ever establish a digital link to Armenia?

DS: We were frustrated about that so we attempted to set up a station there. Two volunteers agreed to go. They knew nothing when they arrived at my house in Cleveland so we trained and equipped them with AMTOR and RTTY. We received donations from such firms as AEA, Kenwood, Yeasu, and other, plus local amateurs spent a fortune buying gear for Armenia. We gave them two-meter equipment, antennas, terminal units, and HF radios, and sent them off to Moscow. We had arranged with the Soviets to transfer them to Armenia to establish the receiving station. But when they arrived in Moscow, the Soviet amateurs took their gear. It disappeared for about six months. A well-known amateur in Moscow coordinated the theft of the equipment. We finally got the gear back and it ended up in Armenia, but we never had the chance to complete the link during the emergency.

As a watershed event, it was many things. It was the first successful amateur-organized relief effort, but more important, it was the first example of how you can organize a community of hams using digital communications to move vast amounts of error-free information across the world.

DJ: What stations were involved?

There were three primary station on the air— WA1URA, KB1PJ, and G4SCA, and we did our job. The following year, 1989, hurricane Hugo hit. There were many packet-oriented people involved but there was little organization and digital communications into the affected area was chaotic. Those of us who were AMTOR-oriented, who understood the incredible robustness of the mode, were in the minority.

We had no receiving station in the Caribbean. Packet operators insisted on sending everything by HF packet but that is not what the Caribbean needed. We spent a lot of money on the telephone trying to clear the channels for traffic. Lack of organization slowed the traffic. I don't think Hugo was one of our more commendable disasters. But we all learned from that experience and improvements have been made.

I remember one sad episode. We had a volunteer from Cleveland who we trained and sent into the Caribbean to take traffic. After he had been there a few days we learned he was not licensed. He had faked his ticket and call sign. It was a setback for us. He later returned and apologized, but it was embarrassing to the amateurs of Cleveland.

By 1989 there were probably a dozen stations involved on AMTOR/APLink. APLink not only let us port the traffic from VHF/UHF packet but it gave us semi-automatic control, which cannot be underestimated. You don't have to sit there keyboarding the traffic all the time, which with the amount of traffic we handled, was both intolerable and impossible.

DJ: Did you play a role in other disasters?

DS: There was the 1989 San Francisco earthquake, where we played some role. In the United States there are a half-million hams and an incredible telephone and amateur communications system that truly eliminates the need for HF digital hams as the only lifeline. We played a minor role, which is okay. But it's in the overseas disasters, where you need long-distance communications, that AMTOR, CLOVER, and other error-correcting modes make the difference.

In 1989 I also took a new job and had to move to the Boston area. One of the things I'm proudest of is that we were so organized that the moment I threw the switch on in Boston, I turned the switch off in Cleveland. There was zero down-time. I physically moved but there was not one minute lost in the transfer of the APLink operation out of Cleveland into Boston.

DJ: Do you see a role for digital communications during future disasters?

DS: To handle disasters effectively we need a system that people are familiar with—we must keep the system greased. We need to encourage people to send neighborly traffic to their fellow hams in other parts of the world. Disasters are rare, but you don't wait for the disaster to learn operating technique. You keep the system operational, running all the time so when disaster strikes, the system and the operators know what to do.

DJ: What role did you play and what system were you using is New England?

DS: In 1990 I moved to New Hampshire where I owned land and could erect a big antenna. Eventually I became the Northeastern gateway for European and, to some extent, African and Asian traffic. For a period of two years I swung the antenna toward Europe in the morning and in the evening toward Asia. By 1992 or '93 thousands of messages were being passed each week. It was here that we really built and refined the system.

By the time I pulled the plug on New Year's Eve 1994, I had a hundred-foot, seven-element tribander pointed toward Europe and Africa with a New England Digital Association (NEDA) NetRom system accepting and sending all of the New England, New York, and New Jersey traffic on a UHF backbone. I had a system that used at first three, and then, when I was able to consolidate, two computers. I had Peter Martinez's PLX system running to Europe because the Europeans prefer PLX software. PLX is run on very few stations. The individuals who use it are absolutely dedicated. Unless you're a devoted user and understand the system, you just can't get into it. In a sense, it has become a dedicated backbone carrier.

The second system was an AMTOR station using APLink. It was for keyboarders and domestic messages in the United States. The third was a W0RLI system that passed UHF traffic to and from the remainder of New England, New York, and New Jersey. When HAL came out with CLOVER, W0RLI adapted his system and dropped the HF packet side. I moved all of the domestic North American traffic into the W0RLI CLOVER system.

All of these systems were linked to one other. Traffic came in and it would be triaged to determine whether it went back out through the same system, went over to another system, or was sent by the third system. For example, traffic coming in on packet would be triaged to determine if it went out on CLOVER, which was for North America, or went out on APLink, which was for domestic keyboard AMTOR, or went out PLX, which was for international backbone AMTOR. Traffic coming in from the international system would arrive on PLX and be automatically triaged into domestic AMTOR, VHF packet, or CLOVER.

DJ: How did your triage system operate?

DS: W0RLI, APLink and PLX permit you to direct traffic according to the continent, the call sign, or the country it's addressed to. The most sophisticated system is W0RLI, far more so than APLink. I never used WinLink, but Frank, WA1URA, and other operators use it.

DJ: Why not?

DS: I didn't want to put all my eggs in one basket. I was running three computers and if one went down, the others remained working. What the WinLink operators do, and understandably so, is put virtually every application into one computer. If something happens, the whole system crashes.

DJ: What hardware were you using?

DS: I used a 486, a 386, and an 8088 machine. I had five different packet TNCs serving two meters, 220, and 440 mHz for the New England/New York area using NetRom, a high-speed backbone system where users never see what's going one but is extremely effective on UHF.

DJ: Was all your traffic handled using RF?

DS: Yes, but I have reached the conclusion that it is now time for a majority of the traffic coming over RF, be it HF or UHF or whatever, to be removed from the airwaves and sent to the land-line. Bulletins and much of the traffic simply should not be on HF. The internet and the telephone

facilitates are in place. They may not be amateur radio, but how many operators spend more time with their computers than they do with their radios? It's time to move it. It's time to free up the HF bands for rag chewing, contesting, and to get the traffic to an area where it's not cluttering the bands.

DJ: Why did you close your station?

DS: In November 1994 I was offered another job. I soon realized I could no longer give the system a daily checkup.

DJ: Do you see a future for HF digital communications?

DS: There is still reason to keep the system greased—in case of disaster. A lot of people are not on the internet. But the capability for faster and less obtrusive communication exists, and it's time for us to link our bulletin board systems into the internet or something equivalent.

DJ: What's happening with David Speltz?

I'm now CEO of a Boston hospital but I spend half my time traveling around the country. There are now so many digital stations on the air that my absence will not be missed. I think the international New England/New York link is still a problem but I donated some equipment to an amateur in Boston and set him up on APLink to handle the international traffic. I hope it's working. There comes a time when if you can't properly maintain the system you just have to realize that and pass it on. It was one of the most difficult things I ever did. Pulling the plug was very, very hard.

DJ: No doubt, David. Thank you for sharing your experiences with us.

Wayne Renardson, NZ4W via
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BULLETIN

ADRS announces new WWW and FTP Internet sites:

ADRS WWW Site at: http://www.iea.com/~adrs

ADRS FTP Site at: ftp.iea.com/public/adrs

The American Digital Radio Society (ADRS), publisher of the Digital Journal, is pleased to announce its new WWW and anonymous FTP site addresses now available for use by its members and others in the world wide ham radio community. The ADRS WWW and FTP servers are at a commercial site with very high capacity connections to the Internet network so that you should encounter no difficulties or delays in connecting!

The ADRS Web Pages describe and give information about the ADRS, its publications and services, and contain what is now probably one of the most complete set of hyperlinks connections to other amateur radio related WWW sites and related Internet sites worldwide! You are invited to visit the ADRS WWW Pages at: http://www.iea.com/~adrs to learn more about ADRS and as one of the best starting point for exploring amateur radio on the Internet! To use the ADRS WWW site, you need will need an access to the Internet which permits you to use Mosaic, Netscape or a similar Web Browser which provides HTTP (Hyper Text Transfer Protocol) capability. (The new Prodigy Internet WWW Web Browser was tested and performs well.)

The ADRS Anonymous FTP server contains software libraries which mirror much of the software which is available on ADRS' BBS, including the latest versions of special software available only from ADRS. Files on the FTP server are downloadable. You are also invited to visit that site at: ftp.iea.com/public/adrs. An extensive listing of other amateur radio Anonymous FTP sites with hyperlinks to those other FTP sites worldwide is also included on the ADRS WWW Pages at: http://www.iea.com/~adrs. To access the ADRS FTP site, you will need an Internet access over which you can use an FTP client to transfer files using FTP (File Transfer Protocol).

BULLETIN

April 1, 1995, Newington, CT

The ARRL DXCC Rules and Regulations Committee announced sweeping changes in the standards for determining country status. "With country boundaries and names changing with the wind it seems appropriate to select a standard definition not subject to dispute or argumentation. Thus, effective immediately, the only, repeat ONLY, definition of a country is that they have a currency listed in the Wall Street Journal's weekly summary entitled 'World Value of the Dollar.' Using that guide, there are now 201 official countries for the purposes of DXCC.

All other countries, regardless of the reason for their original selection, are now deleted." In a word, the DXCCRRC say, if they don't have their own money they don't qualify as a country! It is truly the ultimate reality check. But it won't stop the arguments. There is only one United Kingdom Pound listed, for example. Guess who gets dropped off the list— GD, GI, G J, GM, GU and GW! While the US Dollar classification treats Hawaii and Alaska as merely one of the 50 states, Puerto Rico, Guam and Virgin Islands remain listed. Good hunting.

Please note the date of this news release!

Pactor II - Part IV

Questions & Answers related to PACTOR-II

by Dr. Tom Rink, DL2FAK and Hans-Peter Helpert, DL6MAA
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I. Introduction

As previously mentioned, we conclude this series by answering frequent questions from the readers related to the items described in the previous parts. As the deadline for this final part was before the publication of part three, questions related to the PACTOR-II protocol, that have been sent to the ADRS, could not be considered. For this reason, we answered some typical questions dealing with the same subjects out of our regular correspondence instead. If you have any additional questions, or if you just want to discuss some of the items mentioned, please feel free to attend our PACTOR forum at the Dayton Ham Vention '95, which will be held on Saturday, April 29, between 09.00 and 10.45 a.m. in room no. 7.

II. Frequently asked Questions

Will SCS continue PACTOR-I after the release of PACTOR-II?
For Sure. PACTOR-II is not intended to supersede the current FSK-PACTOR standard. The new level was developed in order to take advantage of the capabilities of new DSP modems, providing a maximum of throughput and robustness within a minimum of bandwidth. It may thus become the new standard mode of the forthcoming DSP hardware generation. As PACTOR Level I already provides virtually optimum attributes obtainable with an FSK system, it will be used as long as FSK modems are used. Therefore, SCS will of course continue producing the PTCplus.

Which companies will license PACTOR-II?
AEA and PacComm have already decided to license PACTOR-II. Additionally, several other companies have indicated their interest in a license. Some of them however, will have to wait until they have developed new units that provide the required processing power to run the PACTOR-II protocol.

Can a PTC-II still contact an older PACTOR-I or AMTOR station?
Yes. The philosophy of the whole development of PACTOR-II is compatibility with older systems. All connects in PACTOR are initiated in the standard PACTOR-I format. Only if both stations are equipped with PACTOR-II, and the 'MYLEVEL' command ot both stations is set to '2' will an automatic change to PACTOR-II take place. Otherwise, the contact remains in PACTOR-I. 'MYLEVEL' is the command, that defines the maximum allowed PACTOR system level, the default value is '2'. The PTC-II also contains AMTOR, RTTY, and CW software as in the PTCptus and with exception to CW, the earlier Z80-PTC. The new PTC-II owner will therefore have no problems in tinding a contact, even if there are not many PACTOR-II equipped stations at first.

What are the operational differences when passing PACTOR-II traffic?
There are hardly any differences in comparison with PACTOR Level I. To set up a PACTOR-II link, you just proceed in the usual way: Enter 'C <CALLSIGN>' to establish a regutar PACTOR-II OSO or 'C !<CALLSIGN>' to initiate a long path link. If the connected station is also capable of PACTOR-II, an automatic switching to the higher level is performed. To control the link (i.e. perform a break-in, change-over, QRT, etc.), you may also still use the existing, freely detinable characters. For an Unproto transmission, you may now not only chose between two arguments, representing 100 and 200 Baud FSK. Additionally, the values 3-6 represent 100, 200, 400 and 800 Baud DPSK with the corresponding error control coding in short cycles, and the values 7-10 represent the same speed and coding levels using data cycles.

Will I be able to use PACTOR-II with my Transceiver?
All modern (and virtually all older) SSB radios will quite happily work with PACTOR-II. The switching times are identical to PACTOR-I, and as the data signals are tailored for an audio bandwidth of 500 Hz, there should be no problems within the audio sections of any radio system. The RF side of the transceiver should have low intermodulation distortion, as the signal is more complex than FSK systems, but providing the transceiver is not overdriven, this should not be a problem. It the radio performed well with AMTOR or PACTOR-I there should be no problems with PACTOR-II. All that is required from the transceiver is an audio input, an audio output, and PTT line. As mentioned before, the frequency stability and accuracy requirements are no higher than PACTOR-I or AMTOR.

Will I get interference from the PTC-II internal computer on my radio?
A good deal of effort has gone into designing the hardware so that it not only does not cause interference, but also is not easily interfered with. All supply lines are filtered, as are the RS-232 and signal inputs and outputs. The circuit board has also been especially designed with short data and address lines and large earth planes to prevent radiation. In any event, it will cause considerably less noise than the computer you use it with.

Do I need a powerful computer for PACTOR-II?
No. All the high-tech, powerful computing jobs take place inside the PTC-II. The interface to the outside world is such that any computer with a standard RS-232 interface can be used to transmit and receive PACTOR-II. Sottware is supplied tor an IBM compatible PC. Almost any computer can be used with the PTC-II using standard terminal software for that machine. A pure software solution for PACTOR-II, using simple interface hardware as in Packet Radio is however very unlikely. For that you WOULD need a very powerful computer.

Does the PACTOR-II Listen Mode require external software?
No, the PTC-II firmware also provides full listen mode capability. Be it simple FSK, or any of the complex convolutional coded DPSK frames, the PTC-II Listen mode checks simultaneously all possible modulation forms of PACTOR-I and -II. Therefore, any plain terminal software on any computer may be used to exploit all the teatures of PACTOR-II.

Can the PTC-II also be operated in FSK mode?
Similar to the previous PTCs, the PTC-II also provides an FSK output line. However, as the PACTOR-II system utilizes DPSK modulation, you have to use the audio line when proposing to operate PACTOR-II. If you plan to restrict to the FSK modes (such as PACTOR-I, AMTOR, RTTY, CW, etc.) in order to use the FSK line ot your transceiver, you have to set the PTC-II command 'MYLEVEL' to '1', so as to prevent the PTC-II from an automatic switching to PACTOR Level II when connecting with another station capable of PACTOR-II.

Is the required frequency accuracy to set up a PACTOR-II link similar to CLOVER?
CLOVER is considered to allow a maximum frequency deviation of around 20 Hz between two stations intending to set up a link. As all PACTOR-II links initially start in PACTOR-I, the required frequency accuracy is only about +/- 80 Hz. When switching to PACTOR-II, a newly developed tracking method automatically adjusts the DSP filters in order to compensate the deviation. Additionally, in the PACTOR-II mode, the tuning indicator of the PTC-II does not only show two LED's representing the two signal tones, but a third LED indicates the absolute trequency offset. If the LED in the middle of the display lights up, you are exactly on zero beat. Each LED deviation in either direction signals a corresponding frequency deviation of 10 Hz. As this indicator is not influenced by the automatic tracking, you are still able to adjust the correct frequency after the link setup.

Can the current PTC mailbox software also be used with the PTC-II?
Most mailbox software designed tor the Z80-PTC, manufactured by PacComm and previously by SCS, as well as for the modern PTCplus may be used with the PTC-II without any modifications. This specially refers to the modified GPLX-BBS by JA3FJ, the KCO-MBX by W8KCO, and AMTBOX by DL7AMW. The Dwell-

Time of the PACTOR-II system, i. e. the period required to detect a connect request, is still about one second. This is identical to PACTOR-I and thus faster than in CLOVER and G-TOR. This Dwell-Time plays a large part for the fast scan stop signal, as required for scanning BBS systems. Since the system does not have to stay too long on one frequency in this case, significantly shorter response times can be obtained.

Will the PTC-II provide a Host Mode for more comfortable terminal and BBS operation?
Yes, a Host Mode will be added in a firmware update. However, in the early stage one has to make do with an expanded status word. In addition to the current information, it shows all link parameters including the PACTOR-II speed levels as well as the kind of on-line data compression used.

Does an upgrade of the PTC-II require an exchange of any memory chips?
The operating system is stored as a compressed file in the flash memory of the PTC-II. It is automatically unpacked and loaded into the static RAM when the system is started. To update the unit, a special program ('UPDATE.EXE') is provided, which electrically erases and re-writes the data field in the flash memory that contains the PTC-II operating system. For this reason, a PTC-II update does not require any modification of the hardware, but can simply be done via the RS-232 interface. The PTC-BIOS is not influenced by 'UPDATE.EXE', therefore any home-made software can continue to be used as before.

Does PACTOR-II build on the novelties of CLOVER-II and G-TOR?
There are some basic attributes that have been adopted from CLOVER, e.g. the use of pulse shaped DPSK modulation combined with error control coding and the employment of modern DSP technology. Even G-TOR encouraged us to do a little protocol change, i.e. adding run-length encoding. Some other features, like the hybrid-ARQ, the obligatory data interleaving, or the simple tolerating of a few bit errors within the CS ('fuzzy' evaluation) are not really new, but have partly been used in a much more sophisticated way before. For example, instead of a 'fuzzy' CS check, PACTOR-I as well as PACTOR-II employ the cross correlation method, which is considered to be the optimum, but requires fine detail analog information from the demodulator section and high processing speed. Taken generally, PACTOR-II builds mainly on PACTOR-I, despite some similarities to other systems.

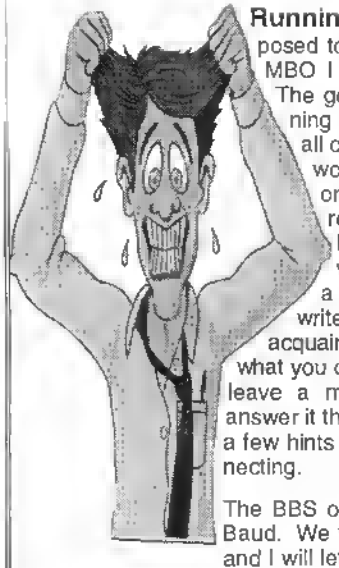
On the other hand, we should not try to compare apples with pears, as PACTOR-II is very different to all previous narrow band digital modes. The Nyquist DPSK modulation and the high performance Viterbi decoding with Soft Decision provide system properties that have been out of reach before. At the moment, PACTOR-II is the most adaptive and most robust narrow band ARQ system you can buy. It of course also provides the best bandwidth efficiency, as it only occupies 450 Hz of bandwidth at minus 50 dB, even if the actual throughput exceeds 1000 bits per second. For the on-line data compression, not only upper and lower case Huffman and run-length encoding are implemented. Additionally, upper and lower case Pseudo Markov Compression (PMC) for English as well as German texts can be chosen. This means, the best out of six different compression methods will automatically and reliably be applied. An overall compression factor of around 2 is achievable with PACTOR-II.

How long until even the PTC-II becomes obsolete?
This is a question that bothers many people as computer systems sometimes become obsolete almost within months. Whilst it is impossible to guarantee, it is not envisaged that the PTC-II will change in the near future. It is such a high performance and flexible unit, that it is considered able to master all tasks applicable to Amateur Radio for a considerable time. Hardware updates have been allowed for in the initial design, and software updates can be easily made using the RS-232 interface into the FLASH memory. There are certain boundaries in physics, beyond which it is impossible to go. PACTOR-II with the PTC-II are pushing very close to these limits. All other present modes are well within the hardware capabilities. It is hoped that some of these other modes will be offered in the future as updates. Future, as yet undiscovered or developed modes are possible, though unlikely to provide a decided advantage over PACTOR-II on HF links. These too should be workable using the PTC-II hardware. Other exotic uses are a matter of programming and imagination. Your PTC-II should not be obsolete for a long time.

Why should I buy 'yet another digital mode'?
The previous sections were perhaps a bit technical. In short, the major advantages of PACTOR-II are as follows:

- Full compatibility with previous PACTOR systems.
- Much greater immunity to interference.
- Greater transmission speed (over 1000 bits per second under reasonable conditions).
- Totally automatic in operation.
- A system gain of around 7 dB compared with present PACTOR systems including analog Memory-ARQ (less power needed).
- Narrow bandwidth (max. 450 Hz at minus 50 dB),

ADRS BBS UPDATE



Running a land line BBS was supposed to be easier than the Amtor/Clover MBO I ran before. Don't you believe it. The good news is that it is up and running and no longer rejecting calls from all ot you. Thanks to Jim Jennings tor working with me on that. Just dial in on 813-922-5409 and it now responds with no trouble. If you do have trouble, please call me on my voice line at 813-923-7008 or send a FAX at 813-927-8178. I intend to write a tew columns such as this to acquaint you with what we are doing and what you can tind on the BBS. You can also leave a message on the BBS and I will answer it there. In addition, I hope to pass on a few hints for making your life easier in connecting.

The BBS operates at a maximum ot 14,400 Baud. We will update it soon to 28,800 Baud and I will let you know when that happens.

Since calls come in from all over the world I know that this will be welcome. The system is Wildcat put out by Mustang Software. In my observation of some of your connects I have noticed that the commands it uses are sometime tar from easily understood so I will go over all of them during the next few months. Let me know it there are any particular questions.

Since we are using Data Compression and Error Correction you will find the throughput to be around 15,000 to 16,000 Baud, depending on the line and connection. Some ot you are using 2400 Baud. Just the cost ot a couple of call and downloading some of the files will pay for you to upgrade to 14,400. Give it some thought.

I have not yet implemented all ot the teatures ot Wildcat. There are several other projects in which I am involved so please give me some time. this accounts tor the message you may get on occasion which says that the Sysop has not yet put information in a particular area.

This is all tor the first time around. I know that Jim, our worthy publisher, has use for the little space we do have so look tor me next month with some pearls of wisdom on how to talk to the ADRS BBS.

Al, W2TKU

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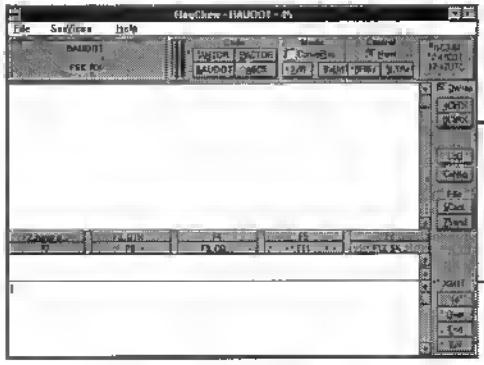

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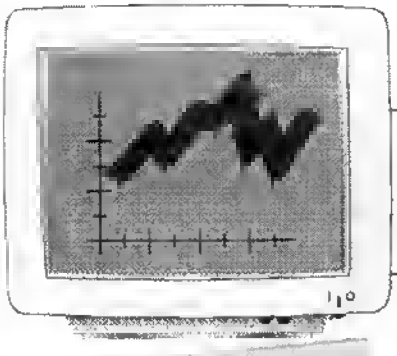

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RS232C & Com Ports Booklet

If you are using a computer in conjunction with ham radio, you will find this booklet an invaluable tool to have in your shack. The booklet contains information about COM ports 1,2,3,4 as well as RS-232C. Cost $5.00 postage paid.

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The Last Word

from the Publisher

Jim Mortensen, N2HOS • PO Box 328 • Indian Rocks Beach, FL 34635
CompuServe ID: 71573,1077

I've been sidegraded and I didn't even know it for at least 48 hours. Nor did I feel a thing. You see, I insfalled Windows NT on this computer nof so long ago. (You'll hear more about that soon). Buried in the 18 pounds of paper included in the pack·age was an offer fhaf couldn't be refused. "*If you are a registered owner of WORD and EXCEL, get a CD·Rom copy of the 32·bit version of both programs for the cost of shipping.*" Hey, what a deal. I called the 800 number, got a prompt response, gave the appropriate serial number off the original disks and was told the total bill woufd be $38.50. Two days lafer the package arrived (even fhough fhey said if would be af leasf fen days). An invoice was included, quite naturally. I was about to pface it in the file when I noficed whaf the charge was for—"Excel and Word Sidegrade, $30, S&H $8.50." Gofta hand it to those guys in Washington. That's a pretty good word! And, by the way, if you have a CD-Rom and if you have an option on any soft-ware purchase you make, go the CD-Rom route. Instafling a big program is so simple, and so tasf.

Now here is an interesting observa-tion! Dan W7GB, in a thoughtful note, suggests that the Coherent CW calling frequency should not be 14026.5 (as I had suggested last month). He explains that 14025 is the calling frequency for CW DX. "Not that one can't ragchew on 14026.5 but, for example, if a rare one like an A51 shows up on 14025 CW, you'd better have enough CW operating savvy and courtesy to understand the sit-uation and know and immediately QSY or QRT is in order. I can just hear a CCW op going on his merry way smack on top of DX, with half the DX world fuming away!". He goes on to say, "Since CCW is a digital mode I think it would be wise to suggest not placing CCW ops in the position of being potentiaf bad boys on the block. Locating CCW in the digitaf end of the band could avoid possible conflicts. It sounds like an interesting mode but let's keep it above 14070."

Now, I am neither a Coherent CW nor an incoherenf CW operator! (Both are digi-faf). But this is an issue worth discussing by those who practice these modes. The suggestion that the CCW crowd should move into the "digital area of the band," or that they should "immediately QSY or QRT," when DX arrives 1.5Khz down, deserves some thoughtful discussion. The Digital Journal is a good forum so let the discussion begin!

Dayton is almost here! All the program plans are compfete (see the listing else-where in the Digital Journal); bus service has been restored; the Chamber of Commerce guaranfees no rain; your friends will be there—now please explain why you are delaying your own plans. Make your reservations now! And don't forget the DX/Contest dinner Friday night and the Digital Joumal dinner Saturday night. All the details are in this issue of the Journal and now is time to order, so get the checks off today.

If you are a RagChew user I am certain you know that there is a new version on the BBS. It is for licensed users only. The program operates more smoothly now, particularly in the RTTY mode. And now all of the HAL card, regardless of serial number run fhe program without a hitch. A few users report a slight video problem but Jim can't replicate the problem so it is assumed that the problem traces to a low level video driver. The Help file is updat-ed. The key files on the BBS are RCWLIST.TXT, a short file which will tell you which files you need to update. RCMODS.TXT is a list of mods that fix minor bugs reported over the past sever-al weeks. Please continue to send your bug reports to Jim KE5HE.

SNAP is a snappy sefter around here. ft comes as no surprise. Look what Peter TY1PS said about it after he received his copy. . . "I love SNAP! It has all the attrib-utes that make a piece of soffware a good application. It's easy to use and has clean screens and is really useful. A fine piece of work." Kudos to Crawford WA3ZKZ who wrote the program and then contributed it to the ADRS. Qrder yours now for onfy $15, postpaid any-where.

Tapani OH2LU is not only a contributor to the WHAT CQMES NEXT article in this issue, he is now a full-fledged member of the Contest Advisory Committee of the ADRS. Since he has been in every digital contest I have ever entered, and he is a serious DX-er as well, I know he will be a valuable addition. The CAC meetings take place on the Internet, so he will always have a voice despite his far-away QTH. Welcome, Tapani!

Art AA3GU, one of our first life mem-bers happened to fax me today. By coin-cidence, it came at the very time I was about to write a paragraph or two about this year's offer. Art had a simple request for a copy of an article. Now I have a sim-ple request to you: think about signing up for life! Do it now, betore June 30 1995, for that is the date the window closes. (It is also the day regular memberships increase). This year the basic (2nd class postage) rate is $350, regardless of your age, anywhere in North America. The cost for membership anywhere else (sur-face mail) is $400. Add $50 for North American Airmail, and $100 for interna-tional. We strongly recommend airmail for most international memberships. And this year, we will even add a friendly cer-tificate to the package. So, be sure to get your checks in before the end of June!

Peter G3fRM stirred up a bit of activity with his first column on Coherent CW. I have had E-mail and phone messages asking for further information. Now Jim KE5HE is thinking about using those techniques to build a system that would give us a thirty word ARQ mode within a 50 Hz bandwidth. There's also news of CCW elsewhere in this issue (see WHAT CQMES NEXT). Maybe it is a mode whose time has come. If nothing else it is, by all accounts, a way to have some fun during the bottom of the sofar cycle.

Yes, the rates go up July 1. It would be nice if we didn't have to five with the real-ities of a budget, even nicer if all those things we need to do cost little or nothing, better if postage rates and paper costs went down instead of up. You know as well as I do things rarely happen in such a favorable way.

ADRS needs to recover the increased costs that hit us, and every other maga-zine in the country with significant postal increases on January 1. But I don't wish to hide behind the post office in order to justify such a significant increase in our membership. The simpfe truth is this: ADRS lives on the dole! Except for the "hard" expenditures such as postage, printing and paper virtually all of the Society's costs have been contributed directly or indirectly by a small group of devoted staff members. Thousands and thousands of dollars worth of phone calls, faxes, postage, equipment, travel, stationery and other out-of-pocket costs have been picked up by these folks with-

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RS-232C and COM PORT booklet: This is a compilation of all articles published in past issues of the RTTY Journal on these two very important topics. If you are using a computer in conjunction with Ham Radio, you will find this booklet an invaluable tool to have in your shack. The booklet contains information about COM ports 1,2,3 and 4 as well as the RS·232C information. Send $5.00 to the ADRS, PO BOX 2550, Goldenrod, FL 32733 and you will receive a copy of this invaluable booklet by return mail, postage paid.

For Sale - AEA PK-64 with HF modem, Commodore C-64, disk drive, printer, Sanyo monitor, all cables and documentation. Worked DXCC and WAS RTTY with this gear. Sold as a system only $175.00. Dovetron MPC-1000R·II $250.00. Barry Fox, W1HFN, 431 Mulpus Road, Lunenburg, MA 01462 Ph: (Days) 603·889-6600 Ext 320 (leave voice mail if not there); (e-mail) fox@imagitex.com (eves) 508-582-7521.

BACK ISSUES - All Back Issues of the Following: RTTY Digital Journal · ATVO · A5 SPEC-COM & ATV TODAY. Write for list & prices · SASE · ESF Copy Service, 4011 Clearview Dr., Cedar Falls, IA. 50613 (319) 266·7040

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out a whimper (most of it before we had our not-for-profit status, so it wasn't even deductible). I am not counting, by the way, the much larger amount of contributed 'services'. I can't even calculate that value! The truth is, the practice cannot continue. It is both an unreasonable request to make of those few who give so much of their time and effort to the ADRS and, like welfare, it is an existence in an unreal world.

We are currently self sufficient. The bills are paid and we are liquidating the debt incurred when the Digital Journal was purchased. But the ADRS is not , by any stretch of the imagination, paying its own way at its current level of activity. And, if the ADRS is to become a lasting and valuable Society, it must begin to invest now in its future and the educational and technical task that its mission requires. Funds are needed for Forum development so our participation at major hamfests is more effective; investment is required to find and produce the tutorial material so urgently needed by the newcomers to the digital bands; more funding is required for software development; advertising funds are needed to recruit a higher membership base; staff costs must increase soon; editorial costs must increase; borrowed software and hardware must be replaced by ADRS investment; and, yes, there must be some modest reserves—and so on and so on. But no funds are needed to pay any director's fees or travel expenses to exotic meeting locations (or any other for that matter). At least for now, the Society strives to recruit those who are both willing to contribute their talent and their own expenses. And we have been fortunate indeed!

So, don't swear at the postman! Understand that it is a process of growing up, of maturing into a vibrant and meaningful educational and technical group that pays its own way and invests, meanwhile, in an even busier and more meaningful future.

I remember when Paul W4ZB joined the ADRS back in those very early days, well before the time we acquired the Digital Journal. He sent a little note along with his dues that, for some reason or other suggested to me that this was a very special person. I responded and, soon, we were burning up the CompuServe lines with extensive and detailed dissertations on many subjects. Since he is a regular visitor to the Tampa area we soon arranged a dinner at the "94th Aero Squadron," a World War I themed restaurant near the Tampa airport. Many dinners, meetings and dozens of E-mail exchanges later Paul has become a pillar of the Digital Journal and the ADRS. His writings on "Remote Control" and "Lans in the Hamshack" are definitive works. Now, he has shown the same talent in an entirely new area. Six weeks ago, he was introduced to the Internet, and was immediately enthused about the ADRS participation in the WorldWideWeb. So he and Jay WS7I, who arranged a very attractive arrangement with an Internet service provider, devoted the last several weeks to the development of the ADRS "Page" on the Web.

In a word, it is mind boggling. Paul has become a world-class expert on the subject and has written pages and pages of Hypertext that will take you anywhere in the universe of ham radio, computers and technology with the click of a mouse. It is a dazzling performance and leads even the reluctant among us, like me, to jump into the Internet pond.

I won't steal their thunder for we will have, over the next several months, a detailed tutorial and resource description that will take even the beginner (like me) into the wonderful world of the Internet. But there is one benefit I cannot keep secret. The news is simply too good to hide! Everyone, everywhere, who is linked to Internet can be linked the ADRS and to our BBS. Yes, if Ezzat SU1ER wants to download the latest version of RagChew, for example, he doesn't have to pay a toll charge to call Sarasota. All he does is got to the ADRS page on the Web, clicks the file and upgrades in a few seconds. This breaks down all of the barriers to our software distribution problems. And, communication problems, for Ezzat can leave a message for me or any other staff member at the same time. This is real-time dynamite! Al W2TKU will upload all the latest information from the BBS to Internet at least once a week, so celebrate the communications revolution and drop by the ADRS page. And when you do, thank Paul and Jay for a truly splendid job!

Speaking of the BBS . . . we continue to experiment with new services. The latest venture deals with some of the notable series that have run in the Digital Journal. For example, the "Remote Control" series by Paul W4ZB is something that should be in everyone's digital library. So, we are putting it in one ZIP file so you can have it on your hard disk for easy reference. The file is saved in MS-DOS.TXT. After unzipping, Win3.1's WRITE or almost any other word processor can read the file with no problem. If there are graphics they will be saved in a GIF format, another widely accepted format. Watch the BBS or the ADRS Page on the WEB for the latest textbook files for your library.

See you in Dayton!!

73 de Jim N2HOS SK

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